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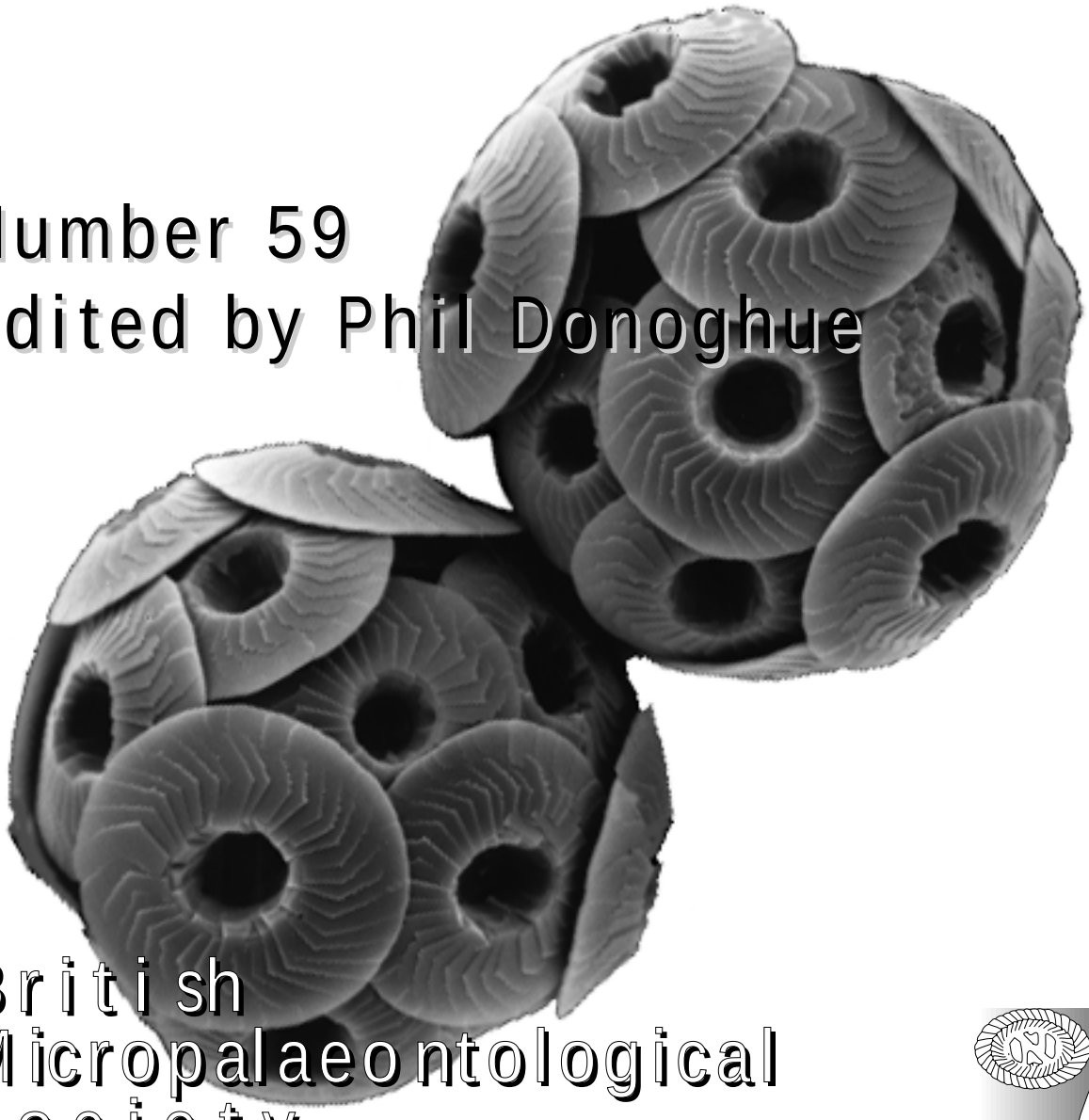
Newsletter of Micropalaeontology



Number 59
Edited by Phil Donoghue

British Micropalaeontological Society

Registered as a Charity No 284013

Editorial

It has been some time since the last issue of the newsletter and I am sure that some of you have been wondering why issue 59 did not hit your doormat sometime during September or October. At the May meeting of the BMS Committee it was decided that the date of publication of the newsletter should be set back until after the AGM such that it could convey news of that meeting. So here it is, better late than never (although I would argue that it is bang-on time, but then I would, wouldn't I?).

Although the newsletter has been distributed in electronic format through the BMS website for some time, this is the first issue to also be available electronically in PDF (Portable Document Format), also available from the BMS website. The benefit of this file format is that it shrinks large documents into very small electronic files, while preserving (perfectly) the intended formatting of text and images. Many of you will already be aware of this format through its adoption by electronic journals. It is hoped that in future the newsletter could be distributed almost exclusively in electronic format, freeing much-needed funds for publication of the journal and providing a better service to the membership.

The previous issue of the newsletter bore a foram on the cover, an image kindly supplied by Paul Pearson (Bristol). Through my usual lack of rigour, I forgot to ask Paul for an explanatory caption in time; Paul has since supplied the following details for those who have not been able to sleep for the past six months, or else wanted to assess their foram-spotting prowess: Globigerinoides trilobus*, a planktonic foraminifer from the middle Miocene of Limalok Guyot, west Pacific (approximately 15 Ma). This is a well preserved specimen, showing minute spine holes on the ridges between pores*. As you will have noticed (or should have - chasten yourself if you did not), the current issue sports coccolithophoroids, an image kindly supplied by Jeremy Young (NHM). I asked Jeremy to come up with something intelligent for the explanatory caption and he supplied the following: *two coccospheres of* Umbilicosphaera sibogae *var.* foliosa*, each about 15 µm in diameter. Sample from plankton filter from the N. Atlantic (26N, 30W, 35 m water depth) collected by Ric Jordan (Yamagata University), SEM from Jeremy Young (NHM).* U. sibogae *is one of six coccolithophore species selected for multidisciplinary study within the CODENET research project* (www.nhm.ac.uk/hosted_sites/ina/CODENET). Just think, a whole nail-biting six months before the next exciting installment!

The ritual list of publications requiring reviewers follows; any prospective reviewers should get in touch with me by telephone or email, but please bear in mind my forthcoming change of address. Best wishes to all.

Arthur, W. 1997: The origin of animal body plans: a study in evolutionary developmental biology. Cambridge University Press, 339pp.

Bartels, C., Briggs, D. E. G. & Brassel, G. 1998: The fossils of the Hunsrück Slate: marine life in the Devonian. *Cambridge Paleobiology Series* 3, Cambridge University Press, 309pp.

Johns, M. J., Barnes, C. R. & Orchard, M. J. 1997: Taxonomy and biostratigraphy of Middle and Late Triassic elasmobranch ichthyoliths from northeastern British Columbia. *Geological Survey of Canada, Bulletin* 502, 235pp.

Norris, A. W. & Uyeno, T. T. 1998: Middle Devonian brachiopods, conodonts, stratigraphy, and transgressive-regressive cycles, Pine Point Area, south of Great Slave Lake, District of Mackenzie, Northwest Territories. *Geological Survey of Canada, Bulletin* 522, 191pp.

Pinard, S. & Mamet, B. 1998: Taxonomie des petits foraminiferes du Carbonifere superieur-Permien inferieur du bassin de Svedrup, Arctique canadien. *Palaeontographica Canadiana* 15, 253pp.

Phil Donoghue (Editor) *School of Earth Sciences, University of Birmingham, Edgbaston, Birmingham B15 2TT, UK.* From January 1st 1999: *Department of Geology, University of Leicester, Leicester LE1 7RH, UK.*
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Secretary's Report

Introduction: 1997/1998 has been my first year as Secretary of the BMS (I was actingSecretary 1996/1997). Although there have been no society-wide meetings during the year, there has been a lot of activity behind the scenes.

Kluwer Academic Publishers

The take over of Chapman and Hall by Kluwer Academic Publishers during thesummer of 1998 has been source of concern to the Main Committee as there are obvious implications for the Society's Special Publications Series. On 9th July 1998, the Society Chairman, Secretary, Treasurer, and Newsletter Editor attended a meeting with Petra van Steenbergen (Publishing Editor, Kluwer) in the Department of Palaeontology, of The

Natural History Museum, London to discuss the situation and plan a strategy in the best interests of the Society. Kluwer are keen to make a relationship with the BMS work, and generally speaking the we are satisfied with the positive response to the questions raised (prints runs, royalties, discounts for members, etc). However, due to the unavoidable absence of the Series Editor (ProfessorMalcolm Hart) a final decision about how to proceed was deferred until after the November 1998 Main Committee meeting. A second meeting with Kluwer has been arranged for 24th November 1998.

Distribution of BMS Special Publications originally published by Chapman and Hall is now undertaken by Kluwer (25% discount to BMS members). There is also a 20% discount to BMS members on selected books published by Kluwer (see separate advertisements in this issue).Kluwer accept payment in NLG, GBP or US$. If members experience any difficulty in ordering books, please let me know directly.

Newsletter of Micropalaeontology
The Main Committee decided at their March 1998 meeting that the newsletter should be published in April (to announce the AGM) and in December (to report on the AGM and announce new officers). Accordingly, Number 58 was issued in April 1998. Thanks are due to Dr Phil Donoghue for his continuing efforts to maintain the high standard he has set.

Website `http://www.nhm.ac.uk/hosted_sites/bms`
The website has two regular updates each year to accommodate the newsletter, with smaller irregular updates (to include specialist group news, new links, etc). Specialist Groups are urged to take advantage of this facility. A domain name (bmsoc.org) has been reserved for future use. The Society is fortunate to have the energy of Webmaster Dr Giles Miller at its disposal.

Special Publication Series
Calcareous Nannofossil Biostratigraphy, edited by Dr Paul Bown, was published in 1998. Thanks are due to Paul and his contributors for all their hard work in producing a magnificent volume which, I am sure, will become an international standard and best seller. Although the book has a Chapman and Hall cover, it is marketed and distribute by Kluwer Academic Publishers (fullprice: £79; 25% discount price for BMS members: £59.25). Other special publications are in the pipeline.

Lyell 2000
The BMS is organizing the Lyell Meeting in the year 2000 on behalf of the Joint Committee for Palaeontology. The topic approved by the Main Committee is' Plankton Evolution and Climate Change'. Speakers will be by invitation only, and members are encourage to make suggestions to the BMS Secretary who will be convening the meeting. Lyell 2000 provides the Society with an excellent opportunity to demonstrate to the wider geological fraternity exciting research in this important sphere. The meeting will take place at the Geological Society, Burlington House, Piccadilly, London, probably during February.

Annual General Meeting
Following discussions with Professor Alan Lord (UCL), the Main Committee decided to change the format of the Annual General Meeting. The new venue, the Gustave Tuck Lecture Theatre at UCL, is smaller and more appropriate to ouruse than the Anatomy Lecture Theatre. About 80 members attend the 1998 AGM.

Following Society business (see below), two talks were delivered by Dr MatthewJ. Collins (Postgraduate Institute in Fossil Fuels and Environmental Geochemistry, University of Newcastle) entitled 'Small Beginnings: Ancient Biomolecules and Micropalaeontology' and by Dr Norman Macleod (Department of Palaeontology, Natural History Museum, London) entitled 'The Renaissance of Graphic Correlation'. The Society is grateful to both Matthew and Norm for taking the trouble to prepare and deliver such enlightening presentations which stimulated much discussion.

Afterwards, the wine reception, generously sponsored by Robertson Research International Ltd, was held in the South Cloisters which provided less cramped conditions that the Rock Room. As an experiment, commercial and academic posters were on display, and 15 contributions were forthcoming. If these arrangements are considered to have been successful, then they will be repeated at the 1999 AGM. Special thanks are due to Jim Davy, Local Secretary, for his devoting his time and energy to the AGM logistics.

Changes to the Committee
Professor Dick Aldridge stood down as BMS Chairman at the 1998 AGM. The Society is indebted to Dick for his energetic commitment to the Society and for his representations to the Joint Committee for Palaeontology over the past three years. The Main Committee is pleased to announce that Dr John Whittaker

(Department of Palaeontology, Natural History Museum) has accepted our invitation to stand for election as Chairman (proposed by Dr Jim Riding and seconded by Dr Ian Wilkinson). Dr Whittaker was elected unopposed at the 1998 AGM.

Dr Jim Riding has completed his first three years as BMS Treasurer, and wished to be considered for re-election for a second term (proposed by Professor Dick Aldridge and seconded by Dr David Siveter). Dr Riding was elected unopposed at the 1998 AGM.

Changes to the Constitution and Rules of the Society
At the March 1998 Main Committee meeting, it was agreed that the Chairman, Secretary and Treasurer should review the Constitution and Rules of the Society. The following changes were agreed by the Main Committee prior to the 1998 AGM where they were approved unanimously. The amended Constitution and Rules of the Society will appear in the next Directory of Members scheduled for 1999.

Article 4. Membership. The phrase 'in the British Isles or in the British geological sequence' has been removed.

The first sentence of Article 4 now reads: 'Membership of the Society shall be open to all persons and organisations engaged or actively interested in the science of Micropalaoentology'. This change was made to reflect more accurately the composition of the membership which is becoming increasingly international.

Article 5. Main Committee. Remove Membership Treasurer from the Main Committee and insert a Special Publications Editor, a Publicity Officer, and a Webmaster, and remove reference to the number of Specialist Groups.

The first sentence of Article 5 now reads: 'The business of the Society shall be conducted by a Main Committee consisting of a Chair, a Secretary, aTreasurer, a Journal Editor, a Newsletter Editor, a Special Publications Editor, a Publicity Officer, a Webmaster and elected representatives from each of the Specialist Groups'. These changes accommodate new officers to the Main Committee. The role of Membership Treasurer will be divided between the Treasurer (invoicing) and the Secretary (database).

Rule 3. Terms of Office, Part iii). Insert the Journal Editor, the Newsletter Editor, the Special Publications Editor, the Publicity Officer and the Webmaster, so that they, as well as the Secretary and the Treasurer, 'shall be elected initially for a three year term of office but may be re-elected for a second term of office in that position'. Previously these officers only served for an initial term of two years. The change should provide greater continuity to the Main Committee.

Rule 4. Nominations and Elections, Part i). Insert the phrase 'All nominations for election to the Main Committee should be proposed and seconded by members of the Society.' This addition insures that only members of Society may make nominations.

Specialist Group Activity
Conodont Group: Annual Group meeting in South Wales (14-15 December 1997) to visit type area of the latest Triassic Penarth Group (coastal section between Penarth and St Mary's Well Bay led by Andrew Swift) followed by a day of talks prior to the Pal Ass annual meeting in Cardiff. Alistair Bowden will replace Gail Radcliffe as Group Secretary at the 1999 AGM. Foraminifera Group: Spring Group meeting (24 April) comprising a day of talks at The Natural History Museum, London, followed by a field meeting to Southampton to collect living benthic foraminifera led by John Murray. Details of the meeting, including abstracts, are available on the Website. Nannofossil Group: A week-end fieldtrip to northern Belgium (12-14 June 1998) to examine Tertiary sections (led by Ettienne Steurbaut). A talks meeting was not arranged due to the INA meeting taking place during 1998. Ostracod Group: A weekend field meeting based at Weymouth, Dorset (17-19 April 1998) to collect Holocene sediments at Chickerell, Abbottsbury, Radipole Lake and Lodmore Marsh (led by Alasdair Bruce), and also to examine the type Purbeckian-Wealden section at Durleston Bay (led by Roy Clements). Palynology Group: Little activity. Sandy Smith replaced Duncan McLean as Group Secretary at the 1998 AGM. Silicofossil Group: At the 1998 AGM, the membership approved the formation of a new Specialist Group to accommodate siliceous microfossils (diatoms, radiolaria, silicoflagellates, etc). The new group is to be called the 'SilicofossilGroup' and will be chaired initially by Dr Jenny Pike, with Dr John Gregory as the first Secretary.

James Powell (Secretary)

Journal of Micropalaeontology

As members of the Society will see from the inside of the front cover, there have been a number of significant changes in the way in which papers are processed for the Journal. Coupled with the change in Editor it was decided that a number of additional 'sub-editors' be taken on to increase the size of the editorial board and provide a greater breadth of subject coverage. Chris Hunt [palynology] , Chris Denison [dinoflagellates], Kjell Bjorklund [siliceous microfossils], Kerry Swanson [ostracods] and Giles Miller [phosphatic microfossils] have, therefore, replaced Roger Davey [palynology] and Patrick De Deckker (ostracods). Sincere thanks to Roger, Patrick and - of course - John Murray for their help in getting the Journal to its present position.

Volume 17 parts (1) and (2) have - just about - appeared on time, although part (2) was a little traumatic with very few papers coming back from authors with corrections completed. Without magnificent work by both Mary Ker (Geological Society Publishing House) and the printers 17(2) would not have appeared when it did!

Submission rates are holding up with 25 papers either at review or with authors for revisions. Already half the pages for 18(1) are allocated. The publication delay rate is probably 12 months at present, which is on a par with many other Journals. Now that the Journal is included within the citation index listings it has a (perceived) higher impact rating and, as such, should be attracting 'good' papers.

One matter under active consideration is whether the Journal should move to a quarterly publication schedule. This might increase still further the status of the Journal, but would only be contemplated if submission rates increased slightly. The Committee of the BMS will be reviewing the financial implications of such a move in concert with the current publishers, the Geological Society Publishing House. Clearly, with library subscriptions a target for cuts in many institutions, this is not the time to expect major increases in institutional subscriptions! A move to increase the volume of published material would only take place if the quality of the contents could be maintained (or enhanced).

Malcolm Hart (Editor)

Treasurer's Report

At the time of writing (September), there is nothing major to report on the BMS financial front. We continue to have enjoy relatively good financial health and we should go into 1999 with a surplus of funds. I hope to instigate a covenant scheme in time for next years subscriptions. If you know of colleagues who are not BMS members and should be, please persuade them to join us.

Jim Riding (Treasurer)

BRITISH MICROPALAEONTOLOGICAL SOCIETY

STATEMENT OF ACCOUNTS FOR FINANCIAL YEAR 1997/1998

Income		
Balance from 1996/97:		**£3,650.74**
Membership Subscriptions:		
Individual/Student for 1997	£60.00	
Individual/Student for 1998	£10,300.50	
Individual/Student for 1999	£130.00	
Individual/Student for 2000	£75.00	
Individual/Student for 2001	£50.00	
Subtotal:		£10,615.50
Library Subscriptions for 1998		£11,172.00
Total subscription income:		**£21,787.50**
Miscellaneous Income:		
Sale of Journal Vols. 1-16		£409.20
Advertising revenue		£150.00
BMS Foundation		£385.00
Book royalties (Chapman/Hall)		£1,079.82
Interest from two bank accounts		£504.30
Subtotal for miscellaneous income:		**£2,528.32**
TOTAL INCOME		**£27,966.56**

Expenditure

Journal of Micropalaeontology:		
Volume 17, Part 1 (inc. postage)		£9,888.00
Volume 17, Part 2 (inc. postage)		£9,888.00
Total:		**£19,776.00**
Newsletter of Micropalaeontology:		
Number 58		£318.13
Postage/packing for number 58		£378.14
Total:		**£696.27**
Annual General Meeting 1997:		
Hire of lecture theatre		£261.00
Speaker's expenses		£81.42
Committee meeting expenses		£5.25
Total:		**£347.67**
Miscellaneous Outgoings:		
Secretary's expenses	£135.03	
Direct Debit commission/fees		£123.76
Credit card services/commision		£276.33
Postage for Journal backparts		£92.36
Calc. Nannofossil Group field trip		£90.00
Stationary		£9.00
Internet domain name fee		£43.03
Total:		**£769.51**
TOTAL EXPENDITURE		**£21,589.45**

BALANCE FOR FINANCIAL YEAR 1997/1998: £6,377.11

This financial year ran from 13 November 1997 to 11 November 1998

James B. Riding (Honorary Treasurer)
Bernard Owens and Ian P. Wilkinson (Honorary Auditors)
11 November 1998

New Members

We warmly welcome the following new members who have recently joined the Society: Emma Atkinson, William E. N. Austin, Mark Callaghan, Thomas Demchuk, Louise Ennis, Samantha Gibbs, Jennifer Greenhalgh, Siân Griffiths, Ruth Hale, Craig Harvey, Ian J. Hawkes, Sameena Khan, Stella Kortekaas, Kate Lavender, Anne Miller, David North, Jennifer Pike, Mark Riordan, Silke Shlirs, Michael H. Stephenson, Donata Violanti, Aubrey Whymark, Jason M. Woodward and Tim N. Wright.

Deeds of Covenant

As I mentioned at the recent AGM, the committee has decided to instigate a system of covenanting for the BMS starting in 1999, and we would like every UK-based Society member who is a taxpayer to sign up for this scheme. The signing of a Deed of Covenant helps the Society as it makes your membership subscription go significantly further. A Deed of Covenant is a simple written agreement which allows the Society to reclaim from the Inland Revenue the income tax that you have already paid on your annual membership subscription. This is only applicable, however, to UK taxpayers. A Covenant lasts for the duration of your membership, with a minimum of four years. However, the Society can release the covenanter from a Deed if it receives a written request to this effect, or if for any reason the member wishes to resign from BMS within these first four years. The wording of the Covenant effects automatic adjustment if subscription rates change in the future. Please note that the Deed of Covenant is not a method of payment and you should continue paying your annual BMS subscription by direct debit, credit/debit card or cheque/cash as normal. The current basic rate of income tax is 23%, hence a Covenant considerably increases the value to the Society of your annual subscription. To summarise, if you pay the BMS an individual subscription of £25 under a Covenant, the Society is able to collect £7.47 from the Inland Revenue. The underlying principle is that on the £32.47 of yours, you paid 23% Basic Income Tax (£7.47) and paid BMS the remaining £25. With a covenanted subscription, the Inland Revenue returns that £7.47 Basic Income Tax to the Society.

I will be mailing the Deeds of Covenent together with the 1999 invoice to all UK-based members during January next year. To instigate your covenant to BMS, simply fill in your name and address and sign the covenant in the presence of a witness after crossing out the categories of membership which do not apply to you. (The witness can be anyone over 18). You can mail back the completed form with your subscription cheque for 1999. At a later date, when all annual subscriptions have been paid, I will ask you to sign a

simple form (R.185), which certifies that you are a UK taxpayer and that you have paid the appropriate subscription. The completed R.185 form enables the Society to reclaim the income tax paid from the Inland Revenue in the first and each succeeding year that your membership continues. I hope that I have explained Deeds of Covenant clearly. If you pay UK Income Tax, please complete the Deed of Covenant form in January and return it to me. The funds received from the Inland Revenue will greatly aid the publishing and meetings programme of the Society. The extra income will also help us keep the annual subscriptions to individuals and students at their present rates. Thank you very much in anticipation.

Jim Riding (Treasurer)

Future of the BMS Website

This year the society purchased a domain name for our website. This gives usthe right to use the URL http://www.bmsoc.org. Unfortunately, the NaturalHistory Museum, who currently host the site, cannot support this domain name. Since the current webmaster, Giles Miller, has indicated that he does not want to stand for re-election at the end of the year, this would seem a suitable time to consider the future of the website. We are therefore looking for someone to take over the running of the website from next November, or sooner. Preferably this should be someone who can host a website on a reliable server that can maintain domain names. If you are interested in becoming the next webmaster then please contact Giles Miller at the address below.

Giles Miller *Department of Palaeontology, The Natural History Museum,Cromwell Road, London SW7 5BD, UK.*

Formation of the Silicofossil Group

Siliceous microfossils form an important part of all aspects of micropalaeontology. Fossils that could be included under such an umbrella are the diatoms, radiolarians, silicoflagellates and sponge spicules. These organisms have traditionally been taken under the umbrella of the other specialised groups, with the intention of running occasional joint meetings on siliceous microfossils. This has not happened, and the promotion of siliceous microfossils has fallen by the wayside ..... UNTIL NOW! The Committee has unanimously approved the formation of a specialised Silicofossil Group within the BMS and this was ratified at the 1998 AGM, with Jenny Pike as Chair and John Gregory as Secretary.

The Silicofossil Group will actively foster links between industry and its kindergarten - academia. The industrial requirement for siliceous microfossil expertise will never be as great as for the calcareous microfossils, for example, however it is evident that a large number of the siliceous workers currently members of the BMS are industry-based. It is important for the future of siliceous microfossils in the academic and applied worlds that the supply of people interested in siliceous micropalaeontology does not dry up. It is crucial to provide a forum in which students, academics and their industrial colleagues can meet, and keep up general awareness of siliceous microfossils and all their possible applications. As someone who has recently 'been through the system' I (Jenny) can say that I would definitely have benefited from being exposed to such a group of people (. . . and to the social niceties too!).

The Silicofossil Group will hold regular annual meetings, to provide the forum outlined above. Siliceous microfossil meetings organised in the past were always well attended, and future successful meetings will promote siliceous microfossils and also, we hope, membership of the BMS. Previous meetings held under the banner of miscellaneous and/or siliceous microfossils were held provincially, as well as in London, which proved popular with the large number of microfossil workers not based in London, and we will continue with this tradition. Meetings held by the Silicofossil Group would also promote interaction between workers on the various different siliceous microfossil groups, disseminating ideas and information, for example, on state of the art processing and analytical techniques.

Discussions with BMS members prior to the inauguration of the Silicofossil Group demonstrated that there is a dedicated core of members with long-term support for a Silicofossil Group. We believe that with well-organised and advertised meetings over the first few years, a core of dedicated people will be maintained, and submissions of siliceous papers to the Journal of Micropalaeontology will be encouraged (hint, hint!).

The Silicofossil Group hopes to provide a support and information network for budding siliceous micropalaeontologists, as well as old hands who have been at it for years! Other specialised groups provide this kind of informal network and we hope that the

Silicofossil Group can fulfil this role for siliceous workers now and in the future. We will endeavour to keep the Silicofossil Group well balanced, selecting the Chair and Secretary from different floral/faunal backgrounds (!), and from different vocational backgrounds, i.e., one from industry and one from academia.

We would like to thank those members who have helped with the formation of the Group, and would like to hear from any members who are interested in the business of the Silicofossil Group and would like to be kept on the mailing list to receive information about future events and meetings.

We wish you all a very successful 1998 - the Silicofossil Group intends to have one!!

Jenny Pike & F. John Gregory

ECOS VII Field Guides Available

A limited number of copies of these stupendous field guides/monographs (reviewed in this issue of the *Newsletter*) are still available: the cost is: Sardinia Field Trip Guidebook (Italian Lire) 35,000; Southern Alps Field Trip Guidebook (Italian Lire) 35,000. Orders to: Dr Maria Cristina Perri, Dipartimento di Scienze della Terra e Geologico-Ambientali, Via Zamboni 67, I - 40126 Bologna, Italy [perri@geomin.unibo.it]. Payment may be made by bank transfer on the account: Comitato ECOS VII, Bank Account No. 796441, SWIFT BPMOIT22, Banca popolare dell'Emilia e Romagna, Via Massarenti 228, I-40138 Bologna, Italy. However, if preferred, it is possible to send a personal cheque or cash directly toDr. Maria Cristina Perri, Dipartimento di Scienze della Terra e Geologico Ambientali, Universiti di Bologna, Via Zamboni 67, I-40126 BOLOGNA, ITALY.

New Publication from Palaeontographica Canadiana

Palaeontographica Canadiana is a monograph series of major contributions to Canadian paleontology that is dominantly, but not exclusively, systematic in content. The series is sponsored jointly by the Canadian Society of Petroleum Geologists (CSPG) and the Geological Association of Canada (GAC).

Taxonomie des petits foraminifères du Carbonifère supérieur-Permien infèrieur du bassin de Sverdrup, Arctique canadien. Sylvie Pinard et Bernard Mamet. 1998. Palaeontographica Canadiana No. 15, 251 pp., 42 pls. ISBN 0-919216-63-3. CSPG price $64 CAN$ + $3.75 CAN$ shipping + GST in Canada, $64 CAN$ +$7.50 CAN$ shipping in USA. Elsewhere, contact CSPG. GAC price $72.50 CAN$ in Canada, $72.50 US$ elsewhere (appropriate taxes and shipping charges included).

Other monographs (see GAC's home page for tables of contents and abstracts) in the series that would interest BMS Newsletter readers are:

Palaeontographica Canadiana No. 4. Fensome, R.A. 1987. **Taxonomy and biostratigraphy of schizaealean spores from the Jurassic-Cretaceous boundary beds of the Aklavik Range, District of Mackenzie**. 49 pp., 5 pls. (no ISBN number). CSPG price $15 CAN$ + $3.75 CAN$ ship + GST in Canada, $15 CAN$ +$7.50 CAN$ ship in USA. Elsewhere, contact CSPG. GAC price $18.50 CAN$ in Canada, $18.50 US$ elsewhere (appropriate taxes and shipping charges included).

Palaeontographica Canadiana No. 8. Braman, D.R. and Hills, L.V. 1992. **Upper Devonian and Lower Carboniferous miospores, western District of Mackenzie and Yukon Territory, Canada**. 97 pp., 24 pls. ISBN 0-920230-80-6. CSPG price $38 CAN$ + $3.75 CAN$ ship + GST in Canada, $38 CAN$ +$7.50 CAN$ ship in USA. Elsewhere, contact CSPG. GAC price $43.50 CAN$ in Canada, $43.50 US$ elsewhere (appropriate taxes and shipping charges included).

Palaeontographica Canadiana No. 11. Zailiang Ji and Barnes, C.R. 1994. **Lower Ordovician conodonts of the St. George Group, Port au Port Peninsula, western Newfoundland, Canada.** 149 pp., 25 pls. ISBN 0-920230-86-5. CSPG price $38 CAN$ + $3.75 CAN$ ship + GST in Canada, $38 CAN$ +$7.50 CAN$ ship in USA. Elsewhere, contact CSPG. GAC price $47 CAN$ in Canada, $47 US$ elsewhere (appropriate taxes and shipping charges included).

Publication Distribution Offices:
Geological Association of Canada, Publications, Department G222, Department of Earth Sciences, Memorial University of Newfoundland, St. John's, Newfoundland A1B 3X5
gac@sparky2.esd.mun.ca
http://www.esd.mun.ca/~gac

Canadian Society of Petroleum Geologists
http://www.cspg.org

Readers from outside of Canada who wish to order copies should check latest prices through the home pages of both GAC and CSPG. In general, the CSPG price may be less expensive than the GAC price for orders from the United States, and perhaps from elsewhere (cf. above).

A.D. McCracken, Editor of Palaeontographica Canadiana*, c/o Geological Survey of Canada, 3303-33rd st. NW, Calgary, Alberta, Canada T2L 2A7*

Forthcoming Meetings

Society for Integrative and Comparative Biology, Denver, U.S.A. 6-10 January 1999. Details: http://www.sicb.org/

GAC/MAC Meeting Sudbury, Ontario, Canada. Details: P. Copper, Department of Earth Sciences, Laurentian University, Sudbury, Ontario, P3E 2C6, Canada. Tel: (705) 6675 1151, Ext: 2267; Fax: (705) 675 4898; Email: gacmac99@nickel.laurentian.ca

Life And Environments In Purbeck Times 19th - 22nd March 1999. The Purbeck strata of Dorset (Upper Jurassic - Lower Cretaceous) have long been known for their diverse vertebrate fauna. The invertebrates, though less intensively studied, have and continue to provide important environmental information. The sedimentology and environments of deposition have received close attention but remain a field of considerable interest. The organising committee believe that the time is ripe for a multi-disciplinary meeting to consider the many lines of research being followed and the evidence which is being generated.

The symposium, Life and Environments in Purbeck Times, sponsored by the Palaeontological Association, will provide researchers with overlapping or related interests from across the world with the opportunity to hear at first hand the work which has and is being carried out on these mid-Mesozoic sediments.

The meeting is to be based in Dorset County Museum in the historic county town of Dorchester (Dorset, UK) from 19th - 22nd March 1999. Accommodation is available in the hotels and bed and breakfast establishments in Dorchester and Weymouth. Good transport links exist and consideration is being given to bussing delegates from Weymouth if numbers demand. Accommodation lists will be sent with the second circular.

The symposium will have three days of contributions from invited speakers and a one day field excursion. The provisional programme is as follows: Day 1. Stratigraphy: stratigraphic framework (bio-, litho-, magneto-stratigraphy etc.). Sedimentology: tectonic framework, clastics, clay minerals, carbonates and evaporites. Palaeobotany: Cyanobacteria, Charophyta, conifers, Bennettitales and palynology. Day 2. Invertebrates: isopods, ostracods, insects, molluscs, other invertebrates and ichnofossils. Vertebrates: bony fish, amphibians, small reptiles (lizards, sphenodontians), turtles, crocodiles, ornithischian and theropod dinosaurs, pterosaurs, reptile eggshell, mammals and trace fossils. Day 3. Field trip: Provisionally, visits by coach and car are planned to some or all of: Worbarrow Tout, Lulworth Fossil Forest and Portland. Day 4. Overviews: The Purbeck strata in a regional, European and world context with contributions on palaeogeography and palaeoclimate. Posters on themes relevant to the meeting are welcome.

There is a possibility that some funding may be available to support attendance at this meeting (covering conference fee, accommodation and field excursion). If you are unable to fund yourself and would like to attend, please write to Andrew Milner (Dept. of Biology, Birkbeck College, Malet Street, LONDON WC1E 7HX) or Paul Ensom (Dept of Palaeontology, Natural History Museum; P.Ensom@nhm.ac.uk) preferably giving the name of a referee who would support your application.

Major Events in Early Vertebrate Evolution - Phylogeny, Palaeontology and Development Natural History Museum, London, England, 8-9 APRIL 1999. Convenor: Dr P.E. Ahlberg. Our understanding of the origin and early evolution of vertebrates is advancing rapidly, not only due to new fossil discoveries and phylogenetic analyses, but also to discoveries in developmental genetics. This conference, sponsored by the Systematics Association and the Natural History Museum, will bring together leading workers from palaeontology, developmental biology and comparative anatomy to address the major questions in this field.

The story of vertebrate origins is the story of how the various vertebrate body plans, and the developmental cascades which generate them, were assembled by evolution. General problems include recognising homologous structures and gene expression patterns between groups and understanding the steps by which major morphological transformations were accomplished. Specific topics to be addressed by the meeting include

the origin, patterning and early evolution of jaws, appendages and mineralised tissues, as well as the early diversification of vertebrates.

The meeting will be held at London's Natural History Museum, one of the foremost centres in the world for systematic and evolutionary research. All speakers are invited, but there will be an OPEN POSTER SESSION allowing non-speaking delegates to present their work.

PROVISIONAL SPEAKER LIST: P.E. Ahlberg, W.E. Bemis, J.A. Clack, M.I. Coates, P. Donoghue, P.L. Forey,H.E. Gee, J. Hanken, J.R. Hinchliffe, R. Hitchin, N. Holder, L.Z. Holland, P.W.H. Holland, P. Janvier, R.P.S. Jefferies, J. Joss, J. Mallatt, J.G.Maisey, B.D. Metscher, R.G. Northcutt, M.A. Purnell, I.J. Sansom, H.-P.Schultze, M.M. Smith, M.P. Smith.

For further information contact Dr Per Ahlberg, Department of Palaeontology, The Natural History Museum, Cromwell Road, London SW7 5BD, UK. e-mail: pea@nhm.ac.uk fax: (UK) 171 938 9277.

North-central section, GSA 33rd Annual Meeting Champaign, Illinois - April 22-23, 1999 The Illinois State Geological Survey and the Department of Geology at the University of Illinois Champaign/Urbana will host the 33rd Annual Meeting of the North-Central Section of the Geological Society of America. The meeting will be held in The Clarion Hotel & Convention Center in Champaign. Societies and organizations meeting with the North-Central Section include the Association of Women Geoscientists, the Central Section of the National Association of Geoscience Teachers, Great Lakes Section of SEPM, and the North-Central Section of the Paleontological Society.

Papers on all topics listed on the GSA abstract form are invited from students and professionals for presentation in oral or poster sessions. Presentations that may fit into one of the symposia (invited and volunteered papers) are also solicited. Those interested in presenting a paper or poster in a symposium should contact the symposium convener and indicate on the abstract form that the abstract be included in a particular symposium. Special sessions focused on specific themes or subjects will be arranged by the local program committee after review of the abstracts. Oral presentations will be allotted 15 minutes followed by 5 minutes for discussion. Two four- hour poster sessions are planned for each day.

Symposia that might be of interest to BMS members include; Functional Morphology and Paleobiology of Extinct Vertebrates; Symposium on the Silurian System of the Central United States; Paleozoic Environments of the Midcontinent U.S.

Detailed information concerning registration, hotel and motelaccommodations, alternative opportunities in Champaign and centralIllinois, technical sessions, symposia, field trips, and workshops willappear in the January 1999 issue of GSA Today. Inquiries, requests, orsuggestions should be directed to Dennis R. Kolata, General Chair, GSANorth-Central Section, Illinois State Geological Survey, 615 East PeabodyDrive, Champaign, IL 61820, (217) 244-2189, fax (217) 333-2830, kolata@isgs.uiuc.edu

Geological Association-Mineralogical Association of Canada, GAC-MAC Annual meeting, Sudbury 1999, Sudbury, Ontario, Canada, Wednesday-Friday May 26-28, 1999. Symposium — impact events and extinctions: a Special Session in honour of Glen Caldwell. Organizers: P. Copper (Laurentian U.), O.A. Dixon (U.of Ottawa), Jin Jisuo (U. Western Ontario). Sponsored by the Paleontology Division of the Geological Association of Canada

Sudbury, the site of a double extra-terrestrial impact, the 1.8 billion-year-old Sudbury Basin, and the 37 million-year-old Wanapitei crater, indenting the northeast margins of the older structure, is an appropriate host to a special symposium on the controversial relationship between meteorite impacts, mass extinctions, and the evolution of life. Did impacts alter the course of the history of life on Planet Earth. Are impacts a regular and periodic feature and component of planetary surface processes, like others? Or, are impacts extra-ordinary processes which dramatically change the global biota, and re-set the evolutionary clock? Contributors to this symposium, whether they be for or against impact origins of some or all mass extinctions, should reflect not only on the timing and chemical-stratigraphic signature of impacts, but also on any atmospheric and oceanic events which may, or may not, have changed life, particularly as recorded in the five best known mass extinctions, the Late Ordovician, Late Devonian, end-Permian, end-Triassic and end-Cretaceous.

Those wishing to contribute a paper to a special Festschrift commemorating this symposium must submit their papers by May 28, 1999 for publication (contributors need not present an oral paper or poster at the sessions).

Contact: Dr. Paul Copper, Department of Earth Sciences, Laurentian University Sudbury, Ontario, CANADA P3E 2C6 tel (705) 675-1151 fax (705) 673-6508 email: pcopper@nickel.laurentian.ca or Dr. Jisuo Jin Department of Earth Sciences University of Western Ontario London, Ontario, CANADA N6A 5B7 tel (519) 661-4061 fax (519) 661-3198 email:

jjin@julian.uwo.ca. Deadline for abstract submission - January 15, 1999. Check the Sudbury '99 website for details and electronic submission instructions:www.laurentian.ca/www/geology/gacmac99.htm

International symposium on the origin of animal body plans and their fossil records, Kunming, China, June 20-25, 1999. The symposium will be held at the Hot Spring Hotel on the east shore of Fxian Lake, near Kunming, PRC, under the auspices of the Chinese Academy of Sciences. The proceedinsg will be in English and contributed papers will be published in a special volume in the year 2000.

The origin of basic patterns of anatomical organisation, or body-plans, is a central question in evolutionary biology. The relativrely sudden appearence of all major animal phyla in the fossil record, the Cambrian explosion, focuses attention on how, and how rapidly body plans evolved. The aim of this symposium is to bring together interested scientists to evaluate the broader significance of recent research in a variety of fields. For example, the nearby Chengjiang fauna is superbly preserved, and provides an unusually complete record of early Cambrian fossils. Its proximity in time to the Cambrian explosion makes it equally relevant to understanding the origin and evolution of animal body plans.

The finding of 580 million year old fossil animals in phosphate deposits in Weng-an, Guizhou, may also help to shed light on these issues. The Weng-an fauna includes eggs and embryos, preserved in sufficient detail to make inferences about the developmental patterns leading to the emergence of early body plans. This symposium takes an integrated, interdisciplinary approach to the study of the origin and evolution of animal body plans. The organisers encourage not only palaeontologists and evolutionary biologists, but also morphologists and developmental and molecular biologists, to attend and contribute. For example, this international gathering would be an excellent opportunity to report on insights into the role of Hox genes in body pland formation. The presentation of a variety of theoretical perspectives is especially encouraged.

The program will include opportunities to vists the fossil sites of the Lower Cambrian Chengjiang fauna; to study sections of the Cambrian/Precambrian interface at Meishucun, Jining; and to visit the Field Station of Early Life Research Centre, which will hold an exhibition of the Early Cambrian fossils from Chengjiang and Hai-kuo as well as the Weng-an biota from Precambrian phosphates, Guizhou.

Participants may also choose to make an optional pre-symposium excursion June 17-19 to the Precambrian fossil site at Weng-an, and to the Lower Cambrian fossil site at Zhijing, Guizhou, and/or a post-symposium excursion June 26-30 to Dali and Lijiang (in northwestern Yunnan, a region of attractive scenary which is home to the rich culture of the Bai, Naxi and other minority peoples).

If you are interested in participating, (observers are also welcome) and would like to receive further information, please respond, as soon as possible, either to Paul K. Chien or our Chinese host Prof. Junyuan Chen, by email, fax or mail. Prof. Paul K. Chien, Department of Biology, University of San Francisco, 2130 Fulton Street, San Francisco, CA 94117, USA: [fax]+415-422-6363; [tel]+415-422-6755;[email]chienp@usfca.edu Prof. Junyuan Chen, Field Station of Early Life Research Centre, Sanjiacun, Jinning, Kunming 650612. P. R. China: [fax]0871-788-1037; [tel]0871-788-9575; [email]chenjy@jlonline.com

International Workshop on Ichnotaxonomy, Bornholm, 03.-09.08.98.The first International Workshop on Ichnotaxonomy (WIT) was set up todiscuss several problems in the taxonomy and nomenclature of tracefossils, which is currently in an unsatisfactory state. A small group ofactive ichnologists working on burrows, borings and tracks of variousenvironments gathered on the island of Bornholm (Denmark) for a week tofind a preliminary consensus which is presented below. We now invite allother scientists concerned with the subject to critically assess ourconclusions and submit their own ideas. For further details contact Markus Bertling, Geologisch-Palaeontologisches Institut und Museum, Pferdegasse 3, D- 48143 Muenster, Germany. E-mail: bertlin@uni-muenster.de; fax: 49 - 251 - 83 248 91; tel: 49 - 251 - 83 239 42.

47th Symposium of Vertebrate Palaeontology and Comparative Anatomy (SVPCA), Edinburgh, Scotland 8-11 September 1999. The symposium will be preceeded by the 8th Symposium of Palaeontological Preparators and Conservators, 7th September 1999. Both meetings will be hosted by the National Museums of Scotland in central Edinburgh, and organised by the staff of the Department of Geology and Zoology. There will be a reception in the new Museum of Scotland. The independent Dynamic Earth interpretive centre will be open by then; it is the provisional venue for the conference dinner. There will be the usual day field trip on the 11th. For further details please contact Mike Taylor, Department of Geology and Zoology, National Museums of Scotland, Chambers Street, Edinburgh EH1 1JF: [fax] 0131-220-4819; [email] mat@nms.ac.uk

forthcoming meetings

VII International Symposium on Mesozoic Terrestrial Ecosystems, Buenos Aires, Argentina, 26th September to 2nd October 1999. For further details please contact The Secretary to the Symposium, Museo Argentino de Clencias Naturales "B. Rivadavia", Avda. Angle Gallardo 470, 1405 Buenos Aires, Argentina; Tel/Fax: 54-1 983 4151.

IGCP 406: Circum-Arctic Palaeozoic Vertebrates Meeting "Lower-Middle Palaeozoic Events Across the Circum-Arctic "Riga/Jurmala, Latvia, September-October, 1999. All interested Palaeozoic workers are invited to attend the two-day 1999 annual meeting of the IGCP 406 project which will be held in conjunction with (immediately before or after) the 4th Baltic Stratigraphic Conference in Riga and/or Jurmala, Latvia. The 4th BSC is planned to be held on September 27-30,1999. After the scientific sessions of BSC a two-day field trip (October 1-2) is proposed to the most exciting outcrops of Devonian rocks in Vidzeme (north-eastern Latvia).

Presentations to the IGCP 406 meeting are welcome on any topic related to the palaeontology, paleoecology, stratigraphy, palaeogeography, etc. of Ordovician through Devonian vertebrate fossils, as well as their associated fauna and flora and related geological subjects. For this meeting, contributions on the theme "Geological and Biological Events Across the Circum-Arctic" in connection with palaegeography and stratigraphy are especially encouraged. Contributions on geochemistry are also welcome. We invite suggestions for topics of conference workshops.

Abstracts of conference papers should be submitted before March 30, 1999. Thetext (in English, no more than 2 pages, including illustrations andreferences) should be sent by e-mail as ASCII files or as plain text on a DOS-formatted diskette. If you use special or national letters, or you want to add illustrations, please send a hard copy separately. Estimated costs: registration fee: 10 LVL (Latvian lats; approximately 18 USD). The fee will be collected during the meeting at the registration desk. Accommodation: see the First Circular of the 4th BSC. The medium cost of meals in Riga is ca. 5-10 LVL/day. Limited financial support from IGCP is possible. If you are interested, please inform us as soon as you can.

A two-day (October 1-2) excursion after the BSC conference to the mostexciting outcrops of Devonian rocks in Vidzeme (north-eastern Latvia) is planned (see the First circular of the 4th BSC). Estimated cost: 40 LVL (early registration, before April 30, 1999) or 50 LVL (late registration, after April 30, 1999, if free places will be available). The cost of the trip is approximate; it will be given more exactly in the second circular. Deadlines Preliminary registration - December 10, 1998 Abstracts - March 30, 1999 Please let us know if you need an official invitation. For further details contact: Ervins Luksevics, Latvian Museum of Natural History, K.Barona 4, Riga LV-1050, LATVIA. E-mail: `ldm@com.latnet.lv;` fax: (371) 7220092.

Third International Symposium On Lithographic Limestones to be held in Bergamo (Italy) on August 28-september 9, including Pre-Symposium excursion to Central-Southern Italy. For further details contact Dr. Silvio Renesto, Dipartimento di Scienze della Terra, Universiti degli Studi di Milano, via Mangiagalli 34, I 20133 Milano, Italy. Fax +39-02-70638261; e-mail: `renesto@imiucca.csi.unimi.it`

ICVM-6: 6th International Congress on Vertebrate Morphology, Friedrich-Schiller-University, Jena, Germany. Co-covened by J. Matthais Starck and Martin S. Fischer, July 2001. Details: `http://www.zoo.uni-jena.de/icvm-6.html`

Conodont Group

Congratulations to our Secretary Gail Radcliffe who has now completed her Ph.D. and is awaiting her viva. Gail has left Durham and feels that she can no longer carry on as Secretary for this reason. We wish Gail all the best for the future and extend our thanks to her for all her efforts as Secretary particularly for her help in organising last year's Conodont Group Meeting and field trip at Cardiff. Congratulations also to Alistair Bowden who has just been offered a job at the British Geological Survey as a field mapper. He will be able to carry on his part time studies on Carboniferous conodonts to complete his M.Sc. and then convert to a Ph.D. Alistair has offered to take over from Gail as Secretary but not until well into next year. At the time of writing of this report the position of Secretary is therefore temporarily vacant.

In March, Karen Cochrane (University of Birmingham) and Dick Aldridge (University of Leicester) both presented at the Pander Society meeting in Columbus, Ohio. Several members of the British Conodont Group attended ECOS VII in Italy, where the excellent science was accompanied by enormous amounts of good food and wine. Talks were presented by Steph Barrett, Kim Freedman, Mark Purnell, Dick Aldridge (all University of Leicester), Karen Cochrane and Phil Donoghue (both University of Birmingham). In September, Ivan Sansom (University of Birmingham), presented the latest results

of his work with Paul Smith (University of Birmingham) on the Cambrian and Ordovician of North America at SVP in Snowbird (Utah).

Paul Smith conducted fieldwork in East Greenland this summer, which included the first return visit to his PhD sections, while Richard Twitchett (University of Leeds) carried out some fieldwork in Italy. Giles Miller (Natural History Museum) visited Estonia this summer (funded by the Royal Society) and studied conodont collections held at Tallinn, and also had time to collect some Lower Ordovician samples from the Pakri Peninsula, NW Estonia.

Members of the Conodont Group continue to be heavily involved in work on other phosphatic microfossils. Ivan Sansom, Dick Aldridge and Moya Smith (Guy's Hospital) have completed a collaborative project on ichthyoliths from the Llandovery of southern China. Giles Miller has completed a paper with Tiiu Märss (Tallinn Technical University) on conodonts, thelodonts and acanthodians from the Prídolí Series of the Much Wenlock area of the Welsh Borderland. Giles has just taken up a position on the editorial board of the *Journal of Micropalaeontology* as the person responsible for papers on phosphatic microfossils.

Howard Armstrong (University of Durham) reports that work is progressing on Ordovician conodonts from limestone clasts in Silurian (LORS) conglomerates in the Midland Valley (talk to be presented at The Geological Society on 7th December). He has a number of papers in press on chert REE geochemistry and has some exciting developments on growth patterns in deep water conodonts from work with Ph.D. student Caroline Smith. New developments on geochemical analysis of single conodont elements have shown preliminary results that do not appear to be diagenetic overprint. Howard has also spent the last few months trying to buy an SEM, which should be in place by the time that this report is published.

Visitors to the University of Leicester this year have included Joanna Appelt (University of Warsaw, Poland) who came to work on Carboniferous conodonts. Carboniferous conodonts are also being studied by Ana Karina Scomazzon, a research student from the University of Porto Alegre (Brazil), who is at the University of Manchester until April 1999 and would welcome contact with other conodont workers. Prof. Nian-zhong Wang from IVPP (Beijing) visited Birmingham and Leicester to study collections of ichthyoliths from the Tarim Basin, Xingjiang.

An international e-mail conodont discussion group (con-nexus) has now been established by Mark Purnell at the University of Leicester. The aim of con-nexus is to provide a forum for the rapid exchange of ideas and information concerning conodonts and conodont research. This is achieved primarily through the e-mail discussion group (based on listserver software) to which anyone with an interest in conodonts can subscribe by following the instructions below. Once you are a member of the con-nexus list you will be able to post messages to all other members of the group, and will receive all the messages posted to the list by other members. Individuals whose interest in conodonts is non-professional are welcome to subscribe to the list, but the level of discussion is aimed primarily at those who already know something about conodonts. To subscribe to the list, send the following message to `listserv@le.ac.uk`:
subscribe `con-nexus xxxx@xxxx.xx.xx` (where `xxxx@xxxx.xx.xx` is your e-mail address)

The next meeting of the Conodont Group will be on the 15th-16th of December, including a field trip to Barton-on-Sea to look at sharks teeth (well, almost conodonts!) and a morning of talks in Portsmouth. The information given here will be out of date by the time this newsletter is published so please see the Conodont Group page on the BMS website for further details. This can be found at `http://www.nhm.ac.uk/hosted_sites/bms/conod.htm`.

Gail Radcliffe and **Giles Miller**

Stop Press!! In the absence of any volunteers, Paul Smith has offered to take over as caretaker secretary of the group for the next year, although he is quite willing to stand aside if and when a more permanent offer emerges.

The forthcoming conodont group meeting will follow the usual format of a half day in the field on the 15th December followed by half a day of talks on the morning of the 16th. The afternoon of the 16th will be free for sampling the cultural delights of Portsmouth (there is a SeaLife centre and a small geology museum, but a visit to the Mary Rose and its associated museum is highly recommend). Giles is currently liaising with the Tertiary Research Group with regard to the Tertiary coastal section of Bracklesham where the macrofauna includes shark teeth. More news by email. On the evening of the 15th we will stay in Chichester, at the Globe Inn [01243 782035].

The lectures will be held in the Department of Geology at Portsmouth. Four talks plus an open forum have been offered to date: Giles Miller:*Fishy tales of teeth and scales - an unusually well preserved conodont, thelodont and acanthodian fauna from the Pridoli of the Welsh Borderland*; Phil Donoghue: *Conodont histochemis-*

try; Open discussion led by Mark Purnell, Phil Donoghue and Dick Aldridge: *A new orientation and notational scheme for conodont elements*; Mark Purnell[No title as yet]; Howard Armstrong & Caroline Smith[No title as yet]. If anyone else has the burning urge to give a talk we could fit one more in.

Finally, for some really advance notice, the Pal Ass Annual Meeting for next year is going to be at Manchester organised by Paul Selden. This gets us back into conodont territory. Paul's suggestion would be for a field trip to the Craven Basin and SW Askrigg Block, staying in the Ribble Valley. Numerous good Dinantian and early Namurian sections (and some quite superlative pubs) would be within easy reach and sampling of some of Ian Metcalfe's localities would be possible. The area is (literally) home ground for both Howard and Paul so one or both of them could lead it. Does anyone have any alternative suggestions? See you on the 15th or 16th!

Paul Smith *School of Earth Sciences, University of Birmingham, Edgbaston, Birmingham B15 2TT, UK.*

Foram Group

Nineteen ninety-eight was another eventful year for the BMS Foraminiferal Group. Prominent among this year's highlights was the group's annual Spring meeting (held in April at The Natural History Museum) which boasted a number of firsts. The 1998 Spring meeting was the first organized primary by e-mail solicitations—announcements were posted to the PaleoNet and Micropal listservers in Dec. 1997 and all primary communication with the speakers was carried out via e-mail—and the first in which the meeting program and all abstracts were posted on the World Wide Web (via the BMS web site). As a result, the 1998 meeting was by far the best advertised in recent memory (drawing inquiries from several continents), featured one of the most diverse programmes (including contributions from non-BMS members), and was the best attended in recent years. This is strong testimony to the power of electronic communications in general, and the World Wide Web in particular, to contribute to the Society's efforts. Presentations at the meeting itself were of a uniformly high-quality and (as always) featured lively discussions during the question session following each talk and during the wine and cheese social hour that followed the technical proceedings.

The day after the meeting a small, but hardy contingent of BMS-Foram. Group members convened at The Natural History Museum for a Group field trip to Southampton where Prof. John Murray led an exploration of the modern foraminiferal faunas of the Hamble Estuary; the site of several of Prof. Murray's research projects. Each member of the group was supplied with a special, limited edition, illustrated "Field Guide to the Hamble Estuary" prepared by Prof. Murray for the trip that detailed the habitats and faunas of the marsh and intertidal mudflat environments, along with collecting, washing, and preservational tips for dealing with the specimens encountered. The day was sunny (perfect for stalking "wild" nearshore benthic foraminifera), the company was excellent, and the excursion was capped by collecting a 1-meter core through the marsh (currently under study at the University of Greenwich). Needless to say, a grand time was had by all. Our thanks go out once again to Prof. Murray for organizing the trip and to all of the participants. Pictures from the field trip can be viewed in the Foram. Group part of the BMS Web Site.

In addition to the Group Meeting, several BMS Foram Group members attended the Forams '98 meeting in Monterrey, Mexico. Dr. Andrew Henderson reports: On the 4th to the 12th of July the city of Monterrey in north east Mexico was the base for 'Forams '98' the International Symposium on Foraminifera. Hosted by the Sociedad Mexicana de Paleontologia and co-organised by Jose Longoria and Martha Gamper, this symposium carried on from the successful meeting in Berkeley in 1994 and provided an excellent forum for foram discussion. [Note: try saying that after four tequilas!] A three day technical session split between three halls, with concurrent poster sessions, provided an intense (if hectic) environment for discussion and debate on all aspects of foraminifera. Differing from previous meetings the general feeling of the lectures was a move away from pure biostratigraphical studies with more attention devoted to the application of foraminifera to environmental, palaeo-oceanographic, palaeoproductivity and ecological problems (reflecting the current interest in the palaeontological community). This trend was also evident in the three short courses offered, on the ecology of forams, and on their applications in seismic and sequence stratigraphy. The sessions concentrating on the biological evidence of foram evolution provided some very lengthy and interesting discussions. As many more biologists turn their research to the study of foraminifera and contribute to major palaeontological and palaeo-oceanographic symposia like this one, there has been a significant increase in our knowledge of the biology of foraminifera. Of interest were a number of talks applying

molecular methods to resolving phylogenetic problems, which adds enormously to our understanding of foraminifera. However, I believe also that this opens up a whole new can of worms, but hopefully when integrated with existing phylogenetic study methods can unlock some of the systematic problems facing micropalaeontologists today. It will be interesting to note the developments and see what the next "Forams" conference has to offer.

The field trips offered an insight into some of the breathtaking structure of the Mexican Mesozoic Cordillera and one realised that we were only scratching the surface of the complexities of the geology. Plenty of opportunity was given for sampling which will, in some cases, provide relatively unknown assemblages to study (more attention having been paid to planktonic foraminifera). The post conference field trip visited K/T boundary outcrops in the Burgos basin.

There was around 250 participants with a strong showing from both South an North America. European attendance was much less and only a handful of participants came from Britain.

The Mexican hospitality was superb and the venues first-rate - all in all an excellent conference. As always with these largish symposia, like the Mexican geology, there was a feeling that in such a short time period you were never going to see everything that interested you, unfortunately you can't be in three places at once. Still, there are four years to recuperate, save-up and plan, for "Forams 2002" in Perth, Western Australia, and as the next host David Haig said, "pack your sunglasses and suncream, its going to be hot!"- with the current developments in many aspects of foraminiferal research - it probably will be." (see also a second Forams '98 review in this issue of the BMS Newsletter)

Finally, 1998 saw publication of the first volume of the fully electronic journal *Palaeontologia Electronica* (home site: `http://www-odp.tamu.edu/paleo/index.htm`). This journal is sponsored by a consortium of palaeontological societies, including the BMS. It should come as little surprise to BMS members that 50% of the technical articles appearing in *Palaeontologia Electronica*'s inaugural (1998) volume were micropalaeontological articles, including three articles on foraminifera and arcellaceans. The BMS is currently negotiating sponsorship of a UK mirror site for the journal. This mirror will reduce page loading times for BMS members located in the UK and Europe. Reaction to the new journal has been overwhelmingly positive with over 50,000 hits per month from over 60 different countries and favourable reviews being published in both the scientific (e.g., Science, Nature) and popular (e.g., Newsweek) press. If the past year is any indication *Palaeontologia Electronica* should prove to be a very active and high-profile forum for the communication and discussion of micropalaeontological research.

Norm McLeod *Department of Palaeontology, The Natural History Museum, London SW7 5BD, UK.*

Nannofossil Group

We all seem to be industriously occupied with research and workcommitments, it's good to see nannofossil sciences in such high demand.

As for BMS Nannofossil Group activities, this years annual fieldtrip toBelgium in June was as successful an event as last years. In attendancewere Jeremy Young, Matt Hampton, Jackie Burnett, Paul Bown, Patrick Quinn,Emma Sheldon, Markus Geisen, Nicky Hine, Christianne Street, BenWalsworth-Bell and non-geologists Sarah Ford and Debbie Nicholls. Many thanksto Etienne Steurbaut for taking the time to show us some of the Eocenesections that he has been working on around Ghent. However, things didn'tquite go as planned. One car got lost in the streets of Ghent minutes afterleaving the hotel, so while Etienne and one group were collecting superbsharks teeth, the other group tried to make up their own itinery with the aidof field guides and references (taking the opportunity to look at thecemetary at Paaschendale and a section of 'restored' World War 1 trench nearYpres). Field work on the final day was limited and we took a wander throughthe pretty streets of Bruges in the rain before heading back home soaked tothe skin.

As for forthcoming events, we plan another research meeting, provisionallyplanned for February. Sheffied University is the most likely venue. We aim todo another field in the summer, I think Denmark is currently being touted asthe favourite destination.

Other than that, I guess you all know that the second edition of thestratigraphic atlas is now out, (hooray! - its called CalcareousNannofossil Biostratigraphy, edited by Paul Bown) - hopefully everyone has acopy on their desk.

I think thats about all the news, we'll let you know more about dates for theforthcoming events

Matt Hampton *Network Stratigraphic Consulting Ltd, Unit 57, The Enterprise Centre, Cranborne Road, Potters Bar, Herts EN6 3DQ, UK.*

Ostracod Group

The ostracod group visited the south coast of England in late spring. A review of the trip is given at the end of this report. Many thanks to Ian Slipper for undertaking the onerous task of organising another successful trip, my only regrets are that work commitments prevented my attendance. Many thanks to Roy Clements for leading the party over the Purbeck outcrops.

This years AGM marks the end of my two year tenure as group chair. If any of the other group members are interested in taking up the post please contact me (matthew.wakefield@bgtech.co.uk). However, if needs be I am prepared to stand for another term.

Congratulations to Robin Smith (Leicester University) for gaining his doctorate. Robins' thesis abstract is given below.

The biology and ontogeny of Cretaceous and Recent Cyprididae Ostracoda (Crustacea) by Robin James Smith

Abstract: Study of the biology and ontogeny of Cretaceous and Recent ostracods shows that the family Cyprididae exhibits conservative evolution over the last 100 million years. The Cretaceous cypridid ostracod *Pattersoncypris micropapillosa* Bate, 1972, with preserved appendages, is described and details of the limbs of its adults and juveniles are compared with Recent Cyprididae.

A detailed study of the ontogeny of the Recent Cyprididae ostracod *Eucypris virens* (Jurine, 1820) reveals that, with the exception of the last podomere on the antennules, the chaetotaxy (distribution pattern of setae) shows continual development on all podomeres of the limbs. Cyprididae ostracods have a pediform limb in the posterior part of the body, presumably to help them to attach to substrates; this is reflected by the pediform nature of one limb in all ontogenetic stages. This study has also shown that the fifth limb is most probably of thoracic origin and, hence, ostracods have only one pair of maxillae.

The upper lip and hypostomes of 23 species of Cypridoidea (Podocopina) ostracods were studied and significant variation noted in morphology between species, genera and subfamilies. Several features of the upper lip and hypostome are described for the first time. The morphology of the upper lip can be used to identify species, but it cannot be used to diagnose genera or subfamilies.

Spherical objects recovered from acetic acid preparation residues of vertebrate fossils from the Lower Cretaceous Santana Formation of north-east Brazil are postulated to be the eggs of the ostracod Pattersoncypris micropapillosa Bate, 1972. These spheres are phosphatized, range in diameter from 85 to 110 microns, and are comparable in many respects to the eggs of several Recent ostracod species.

Matt Wakefield *BG Technology, Ashby Road, Loughborough LE11 3GR, UK.*

Ostracod Weekend

This year's Ostracod Group field meeting was held in Dorset, over the weekend of 17th-19th April. On Friday evening sixteen Easter-weary ostracod workers assembled at the splendidly named Hotel Mon Ami (situated on the front at Weymouth) to catch up on the gossip and generally chew the fat over a beer or two (at least until the strains of Abba, continually cycling over the hotel music system, drove us out into the wilds of the town in search of food, more alcohol and no more Abba).

Things kicked off to a fine start on a glorious Saturday morning. Alasdair Bruce, who is working on the ostracod fauna from the Fleet for his PhD at Greenwich University, was our guide for the day. At the first stop (Chickerell Hive Point), he gave a impressively in-depth introduction to the area, seemingly unconcerned that in his waders and hat he was providing us with an uncannily accurate impression of a certain well-known brand of lozenge(!). By special arrangements with the local fishermen, three traditional trow type boats had been provided, allowing most of the party to set out (with some slight trepidation) and take samples from several locations across the chilly waters of the Fleet. The spectacle was not so much a mighty Armada, more a ragged rendition of Hawaii Five-O (particularly the rapidly rotating vessel of Ians Boomer and Slipper, both of whom surely cannot have any nautical blood in their families – except perhaps a distant connection to the captain of the Titanic!). Despite the navigational challenges for some, however, several samples were successfully collected and eventually returned to dry land, much to the relief of the less intrepid members of the party, who had spent the time collecting material from the nearby exposure of Oxford Clay at Tidmore Cove (including some beautifully preserved pyritised ammonites and an alarming number of bullet casings from the nearby military rifle-range that were masquerading as belemnites).

The Swannery nature reserve at Abbotsbury was the next port of call, where by special arrangement with

the wardens, we were allowed to sample from several locations normally inaccessible to the public. Material collected included *Loxoconcha rhomboidea*, *Eucypris virens* and *Xestoleberis nitida*. After a pleasing and well-deserved lunch at a nearby pub (followed by ice creams from a fabulous panoramic viewpoint of the entire Fleet), we ploughed on to Radipole Lake, a nature reserve in the centre of Weymouth. Despite a concerted effort by Alasdair (who, in by-now leaking waders, kept popping up from the reeds brandishing a frightening array of plankton nets and other sinister sampling devices that continually startled various bird-watchers), the promised *Cyprideis torosa*, known previously to be present at this site in great abundance, interestingly proved to be somewhat elusive. Our final site of the day, that of Lodmore Marsh, turned out to be much more satisfactory, with some fine examples of *Herpetocypris* contributing to a rich fauna. Sampling activities were also carried out that evening, although generally it was more often the aqueous microhabitats occurring within certain local hostelries that were of interest to most members of the party.

Sunday dawned somewhat less than sunny, although the selection of dodgy mid-Seventies ballads accompanying breakfast more than hardened our resolve to depart for the field without delay. The entire morning was given over to visiting the Purbeck type-section at Durlston Bay, just outside Swanage. Roy Clements (Leicester) proved to be an excellent guide, first comprehensively introducing us to the stratigraphy and well-studied faunal assemblages from the sections, before eventually letting us loose to collect some of the beautifully exposed material. The combination of a rapidly rising tide, persistent (though traditional) fieldwork drizzle, and the algae-slicked rocks meant that more than one member of the party (including, once again, the aptly-named Ian Slipper) were able to take an occasionally more laid-back view of things, although this didn't spoil a fine morning's work. The final location of the day consisted of avoiding the increasingly driving rain by analysing a splendid outcrop of polished Jurassic limestone, fortuitously (and somewhat cunningly) located inside the village pub where we had (coincidentally) booked our Sunday lunch.

As the party eventually fragmented and we made our goodbyes, we were able to reflect on another excellent and thoroughly enjoyable field meeting. Thanks must go to Ian Slipper for organising the whole thing and the effort that our guides, Alasdair and Roy, put into ensuring that we got the most out of our brief time in the field. Only one (rather pressing) matter remains unresolved from the weekend, that of Koen Martens' confusion over the exact definition of a 35 tolpuddle. Answers (and diagrams) on a postcard, please...!

Mick Frogley *Godwin Institute for Quaternary Research, Department of Zoology, University of Cambridge, Downing Street, Cambridge CB2 3EJ*

Palynology Group

Elections for the position of Palynology Group secretary took place earlier in the year. Approximately one third of ballot papers were returned and these provided an obvious majority vote for Sandy Smith of Shell UK Ltd. Sandy takes over as Group secretary at the Society's Annual General Meeting. He comes to the post with enthusiasm and many new and interesting ideas for the development of the Group. I take this opportunity to wish him every success in his new role. On behalf of the Group I would also like to thank the other candidates for their interest in the Group's development.

David Jolley, the Group chair, ends his first two-year term of office at the AGM. In the absence of an obvious successor he is to continue in the position.

There are concerns over the direction of the Group and levels of membership participation. These are perceived as largely related to the current economic and industrial climate. In order to address these issues Dave and Sandy have organised a Group discussion meeting to which all interested members of the BMS are invited. This will take place on Wednesday 20th January, 1999 in the Centre for Palynology, University of Sheffield.

A large contingent of the Palynology Group attended the Symposium of the Commission Internationale de Microflore du Paléozoique held in Pisa in September. Ken Dorning, Stewart Molyneux and Bernard Owens chaired sessions on Acritarch taxonomy; Precambrian to Cambrian acritarchs; Cambrian to Ordovician acritarchs; and Saudi Arabian palynology. Group members also contributed a large number of oral presentations and presented or were represented in 21 papers given in 9 of the 11 sessions (perhaps there is no British interest in Ordovician and Silurian chitinozoans?). BMS members also presented 7 posters which, all in all, indicates a very active area of research.

Duncan McLean *Industrial Palynology Unit, University of Sheffield, Dainton Building, Brookhill, Sheffield S3 7HF, UK.*

Forams '98, Monterrey, Mexico

In early July a small number of British workers joined over a hundred other foram specialists at Forams '98, the latest in a series of international symposia that has grown from the first Benthos meeting, held in Halifax, Canada, in 1975. The symposia are organised by individuals, rather than coming under the aegis of any particular learned society, with all the attendant problems that this can cause, particularly in terms of the costs of communication and publicity. Thanks to the web, much of this can now be done by e-mail and a dedicated set of web pages, and this was the approach of Jose Longoria and Martha Gamper of Florida International University, who had volunteered to run the meeting. One lesson learnt was that messages can go astray, so the final set of speakers did not exactly match the program set out in the volume of abstracts, published as a special publication of the Sociedad Mexicana de Paleontologia, A.C.

The symposium was preceded by a fieldtrip to examine the Mesozoic of the Mexican Cordillera, and followed (starting very early on the morning after the fairwell dinner) by a trip to see the K/T boundary section in the Burgos Basin. Both trips were well attended, and comments from the participants suggest that they were a worthwhile experience.

Each of the three days of the symposium itself began with a plenary session, followed by three parallel sessions of talks. Poster presentations went on at the same time as many of the talks, and, in the afternoons, short courses on Ecology of Foraminifera, Seismic Stratigraphy, and Sequence Biostratigraphy were also held. With up to five different things going on at once, there was always plenty to do, though the inevitable timetable clashes occurred. Unfortunately this was not helped by some of the people chairing talks, who allowed timings to drift, so that going from room to room often meant arriving in the middle of a talk. Add to this that the programme sometimes had to be changed at very short notice (for example when Paul Pearson found himself down to give both his talks at the same time), and some confusion was inevitable.

As far as I could tell, the contingent from Britain was: Kate Darling (Edinburgh), with posters on *The distribution of planktic foraminiferal genotypes in the modern ocean*, and *Planktic foraminiferal RDNA molecular phylogeny indicates ancient divergences in some cryptic spinose species*; Andy Henderson (Natural History Museum) who spoke on *How reproducible are foraminiferal data?: spatial, temporal, environmental and taxonomic domains*; Paul Pearson (Bristol) who spoke on *Morphological evolution and stable isotopic evidence for habitat change in the Eocene Hantkeninidae*, and also *Speciation and extinction asymmetries in planktonic foraminifer phylogenies*; Rachel Preece (UCL) who spoke on *A revision of Miocene benthic foraminifera from Northern Venezuela described by Cushman and Renz 1941 and Renz 1948: the classic fauna revisited*; Melinda Prince (Aberdeen) (whose husband, Iain, a dinoflagellate worker, came along for the ride) with posters *Benthic foraminiferal dynamics from a modern submarine canyon system*, and *The role of agglutinated assemblages in foraminiferal ecological studies: acid treated assemblages from a submarine canyon system*; Eelco Rohling (Southampton) who spoke on *Foraminiferal evidence of glacial sea level lowstands in the last 500,000 years*, and *Abrupt cold spells in the NW Mediterranean*; Antony Wyatt (ex-Aberystwyth) who spoke on *Foraminiferal diversity driven by changes in shallow water areas through time*. Eelco Rohling also was joint chairman of the session on Foraminifera as proxies for paleoproductivity, and at literally the last moment, when it turned out that the chairman was ill, Antony Wyatt took over as chairman of the session on Foraminiferal evolution: macroevolution and speciation.

With such a diversity of talks and posters it is invidious to pick out highlights, particularly as any individual could only attend a small proportion of what was on offer. But some things do stick out in my mind. The talk by Takashi Toyofuku (Shizuoka University) on the effects of temperature and salinity on Mg/Ca and Sr/Ca ratios of the tests of benthic foraminifera, comparing cultured forams with those collected on the sea shore, was thought provoking. Culture studies showed how the ratios could be related to physical conditions, but examination of the individuals collected from their natural habitat suggested caution in use of results from the whole test, which showed variation in these ratios in different chambers (which could be correlated to the time of year that the chambers were formed).

I found most of the results of DNA studies that were presented to be confusing in the extreme. To be told (if I remember correctly, though I could be mixing a couple of talks!) that morphologically almost identical specimens were as different in their DNA as humans and frogs, made me shudder for the future of taxonomy (if, of course, these results mean what is presently claimed). But De Vargas' talk on large and geographically localised differences in the genetics of *Orbulina universa*, which could be related to different water masses in the Atlantic, suggested that some genetic results make sense to the non-geneticist.

There were some talks that I felt suffered badly, in terms of attendance, from the parallel sessions. Andy

Henderson's talk, presenting some results from the Natural History Museum project on the Kimmeridgian, was a case in point. For anyone interested in the use of any kind of statistical data on fossils (and that surely must include just about the whole of the palaeontological community) this talk suggested uncomfortable conclusions. It was a great pity that so few people attended his presentation.

People came to the symposium from all over the world. It seemed that several people had brought their research students with them, particularly groups from the Netherlands and Japan. There was also a good representation from Central and South American workers, particularly employees of National Oil companies, presenting details of their work. But it was noticeable that a number of major oil company representatives attended the symposium, and they appeared very interested in the younger workers. Not all of them were foram specialists, but they were biostratigraphers. This was an ideal opportunity for potential employees to meet and chat with possible employers. There were also a few people looking out for potential postdocs. It was a pity that so few British research students were present to take advantage of the situation.

There was some discussion about the location for the next symposium. Last time it had been a choice between Monterrey and London, but as none of the advocates of London were present in Monterrey, the offers were Barcelona, Egypt, Israel, and Perth (Australia). Following a number of shows of hands, where many more votes seemed to be cast than people present, a paper ballot was held between Barcelona (which was edging ahead on hands) and Perth. Perth won by quite a margin. So start saving for a trip to Oz in 2002.

The talks were held in the Instituto Tecnologico y de Estudios Superiores de Monterrey, with housing in the Radisson Plaza Gran Hotel Ancira. It was not too far to walk between the two sites, but, given the temperature and humidity, most people took the bus service provided. The hotel is a historical landmark, still with the bullet holes in the bar where Pancho Villa was showing off one day. Sponsorship of the meeting was provided by the hotel, Aqua Dest, Coca Cola, Cerveceria Cuauhtemoc Moctezuma (the local brewery), Aerolitoral, Aeromexico, Chevron, and Exxon.

The organisers had provided a number of social events, from the icebreaker on the first night, a Mexican Fiesta on the second, and Farewell dinner on the last. I

A Mexican fiesta at Forams '98. Clockwise from empty seat: Steve Pekar (Rutgers), Tom Dignes (Chevron), Antony Wyatt, Alexa Cameron (Christchurch), Iain Prince, Melinda Prince (Aberdeen), Masashi Tsuchiya (Shizuoka), Hans Hagman (Shell).

cannot say much about the icebreaker, as Moctezuma was taking his revenge, but the other two evenings were certainly colourful. Not least because, for the Mexican Fiesta, hats and scarves were provided for the males, and embroidered white Mexican dresses for the women. These were left in bedrooms before the participants returned from the symposium, with the inevitable odd mistake in sex. Though it was possible to change, a couple of the males obviously decided that the dresses suited them. I don't think that anyone present at the farewell dinner will forget the sight of several senior and not so senior female foram specialists, waving pompons, and singing 'Bye bye bye Forams 98, go go go Australia 2002'.

Add this to the memories of the pyramids of the sun and moon at Teotihuacan, the Aztec ruins in Mexico City, and the silver mines of Zacatecas and Guanajuato, and this is a trip that I will remember for a long time. There is never enough time to do everything, though the reports from people who visited Yucatan, and saw forams floating in the water as they swam out from beaches made of *Discoaster*, suggested that there is still a lot of Mexico that I would like to visit.

Antony Wyatt

English / Spanish collaborative Project

Ian Slipper, Dave Horne and Andy Gale, (University of Greenwich) spent two weeks during September working in northern Spain with Julio Rodriguez-Lazaro and his team from the Univerisity of the Basque Country in Bilbao, Javier Elorza and Anna Pascual. This project is being funded by the British Council Acciones Integradas program, and is to study the Turonian ostracods from the Anglo-Paris, and Basco Cantabrian Basins.

In addition to some very interesting and exiting Turonian sections which yielded very good ammonite faunas, we were shown some Purbeck-Wealden equivalent sections near the Rio Ebro at Aroco by Victor Pujalte. Also we were able to experience the upper navigable reaches of the Ria de Gernika, the Holocene channels of which are being studied by Anna Pasqual for their foraminiferal and ostracodal content.

No excursion to northern Spain would be complete without examining in detail the Tertiary sequences near San Vicente de la Sonsierra where Javier Elorza's cousin's family has been growing Rioja for the last 1000 years..... Our thanks go to Julio and his team for their hospitality.

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5th International Symposium on the Jurassic System

Vancouver 12-25 August 1998

Over 160 stratigraphers, palaeontologists, sedimentologists and micropalaeontologists gathered in Vancouver this summer to discuss, debate and learn about all things Jurassic. The meeting was ably orgnaised by Paul Smith, Jozsef Palfy and colleagues from the University of British Columbia and the Geological Survey of Canada. Field trips to Nevada, the terranes of the Rocky and Coastal Mountains and the Queen Charlotte Islands were enjoyed by those that could afford the quite considerable costs.

There were parallel sessions throughout the meeting divided up into topics such as Sequence Stratigraphy, the Hispanic Corridor, Extinction and Recovery, etc., as well as more traditional sessions on the Lower, Middle and Upper Jurassic. Micropalaeontological contributions were relatively few, scattered throughout the various sessions. Most were very interesting and will appear in the Proceedings of the Symposium later next year. The micropalaeontologists gathered for a discussion session one evening and debated the role of the subject in the work of the Jurassic Sub-Commission on Stratigraphy. The newsletter for Jurassic Micropalaeontologists is to continue and may be available electronically. Anyone wishing to gain access should contact Susanne Feist-Burkhardt at her electronic address [feist@bio.tu-darmstadt.de].

The workshops on the Stage boundary definitions caused the greatest interest. Some Stage boundaries have active working groups while others have barely decided who should be involved. Kevin Page and co-workers appeared to be ahead of the pack in their work on the Sinemurian GSSP, which may - eventually - be located at East Quantoxhead in Somerset. The working group on the base of the Pleinsbachian are also working hard [organised by Christian Meister] and are considering a succession in Robin Hood's Bay [Yorkshire] as a possible GSSP. Geoff Warrington [BGS Nottingham] is co-ordinating the deliberations over the base of the Jurassic, with a number of contender successions in Nevada, the Queen Charlotte Island and Somerset.

The next meeting in the series [the 6th] will be held in three years time in Sicilly, probably in September.

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European Palaeontological Association

The EPA held its annual meeting in Portsmouth in July 1998. This was a joint meeting with the Palaeontological Association and was organised by Dr David Martill and colleagues of the University of Portsmouth. The theme was Cretaceous biodiversity, although most of the talks concentrated on Cretaceous vertebrates - including one talk on a part of one bone of an unknown reptile!

At the Council meeting the evening before the main lecture sessions I found myself elected Vice-President of the EPA, remaining - at the same time - the UK Council Member. Very few UK palaeontologists and micropalaeontologists belong to the EPA which has a wide-ranging European membership. Fees are small and members receive *Europal* bi-annually. The next meeting of EPA is in Lisbon between the 15-18 July 1999 and will involve field excursions to both the Jurassic and Cretaceous sediments of the Lusitanian Basin.

Anyone interested in hearing more about EPA and the meeting in Portugal is invited to contact me by mail or Email [mhart@plymouth.ac.uk].

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7th International Conodont Symposium held in Europe:

Bologna-Modena, Italy. June 24-26, 1998

ECOS VII: Scientific sessions

The scientific sessions for the Seventh International Conodont Symposium held in Europe (ECOS VII) at the world's oldest university, the University of Bologna, commenced on June 24 in the Dipartimento di Scienza della Terra e Geologico-Ambiantale after a round of welcomes from the Congress President, the President of the Italian Palaeontological Society and the Acting Head of the host department.

Congress President, Professor Enrico Serpagli, noted the large number of participants (109) who had made the pilgrimage, many dipping into their own pockets, despite the generally gloomy global picture of declining funding for palaeontological research. Perhaps more striking than the number of delegates was their diversity. This is traditionally a feature of the Pander Society with its high levels of international collaboration; delegates from 27 nations were present. The welcoming comments included a reminder that the University of Bologna has a proud tradition of stratigraphic research in the Carnic Alps and the Dolomites, dating back to Pollini last century. The University was the site of the Second International Geological Congress in 1880. There was also obvious pride in the Department's Geological and Palaeontological Museum (visited by delegates the previous evening), that includes a fully reconstructed Diplodocus. The museum was only recently saved from extinction and opened to the public in 1988. The President of the Italian Palaeontological Society reiterated the words of welcome and noted it was pleasing to have an international focus on such an interesting and controversial fossil group, and noted that despite technological and geochemical advances, fossils are still needed for accurate and viable age determinations.

Dick Aldridge (University of Leicester), recently installed Chief Panderer, presented the invited lecture on the subject of conodont palaeobiology. He noted the talk was primarily a review of developing palaeobiological concepts and summary of current knowledge since the discovery of the whole animal in a museum draw in the early 1980s. He noted that prior to the discovery, palaeobiological ideas were essentially unconstrained. The study of bedding plane assemblages, growth and wear of elements, and modelling of multielement architecture gives a framework on which to develop palaeobiological concepts and noted that the issue of zoologic affinities is a subject that interests a large number of people outside of our own speciality. He then worked through a variety of evidence (paired sensory organs, ray-supported caudal fin, extrinsic eye musculature, and others) and lines of argument supporting chordate affinities.

After the lecture there was a special presentation by the Italian Palaeontological Society to Emeritus Professor Renata Oliviera. This was followed by an initial set of papers covering a range of topics including evolution, palaeobiology and geochemistry under the banner of "contributions of general interest". The palaeobiological theme of the invited lecture was pursued by Hubert Szaniawski (Institut Paleobiologii, Polska Akademia Nauk) who discussed the evolutionary relationships between the earliest protoconodonts, paraconodonts and euconodonts based on interpretations of element morphology of some unusual forms such as *Coelocerodontus*. Karen Cochrane (University of Birmingham) pursued the same issue from a histological perspective challenging the traditional view of euconodont evolution from protoconodonts via paraconodonts. Karen used an unusual presentation graphic representing "white matter" in black! Petrovna Kasatkina (Pacific Oceanologic Institute, Far Eastern Branch, Russian

Academy of Sciences, Vladivostok) argued on the basis of soft tissue homology and analogy that euconodonts are most appropriately considered as close relatives of the chaetognaths and proposed a new superphylum the Chaetodonta consisting of euconodonts and chaetognaths. Stephanie Barrett (University of Leicester) outlined her work on functional morphology of the feeding apparatus via the study of occlusion patterns in prioniodontid Pa elements and speculated on the impact of this on evolutionary patterns during the Ordovician.

The two geochemical papers in this session were cautionary in tone. Studies of rare earth elements in Triassic conodonts by Yasmin Haunold (Institute of Paleontology, Vienna) concluded that variations reflect only very local conditions. A study of strontium isotopes (Julie Trotter, CSIRO Division of Petroleum Resources, Australia) from conodonts of the Early Ordovician Emanual Formation of the Canning Basin showed remarkable heterogeneities within single elements with serious implications for the development of a global strontium curve. This paper generated the most intense and varied discussion of the session, if not the conference.

This first session was followed by a Pander Society business meeting under the guidance of the new Chief Panderer. There were a number of announcements concerning forthcoming meetings and a tale of woe from Godfrey Nowlan (Geological Survey of Canada) concerning sourcing appropriate slides for conodont work. This was followed by a "nostalgia session" wherein participants had the opportunity to embarrass their colleagues with their more youthful images from earlier ECOS conferences. The new Chief Panderer is one of the very few who has attended every ECOS.

The next session of papers ran concurrently with the first IGCP421 meeting of the symposium, wherein the general status of the project to date was assessed. The next batch of papers focussed on the early Palaeozoic and dealt with the more traditional conodont topics of biostratigraphy and taxonomy. This session included three biostratigraphic papers spanning the Cambrian and Ordovician; conodonts from the central Appalachians (John Repetski, United States Geological Survey), conodonts from the subsurface western Canada and Williston Basins (Godfrey Nowlan, Geological Survey of Canada) and the Cambian-Ordovician of the Argentine Precordillera (Guillermo Albanesi, Museo de Paleontología, Universidad Nacional de Córdoba). Two paper focussed on Upper Ordovician conodont faunas from either side of the Atlantic; conodonts from Wales (Annalisa Ferretti, Universita di Modena), and central Nevada (Walter Sweet, the Ohio State University). The final two papers focussed on palaeoecology and taxonomy. Zhang Jianhua (University of Stockholm) presented analysis indicating the Ordovician conodont *Spinodus spinatus* is an deep-water indicator and Anita Löfgren (Lund University) presented a septimembrate reconstruction of *Cornuodus*.

The first session of papers on the second day dealt with Silurian conodonts and biostratigraphy. Peep Männik (Institute of Geology, Tallin) carved up the late Llandovery and early Wenlock *celloni* and *amorphognathoides* zones into 10 new zones based on the *Pterospathodus* lineage. Carlo Corradini (University of Modena, and energetic Sardinian guide) presented a Silurian zonal scheme for Sardinia similar to the original of Walliser (1964) but with some modifications. Viive Vira (Institute of Geology, Tallin) presented work on the Ludlow and Pridoli of the Baltic and subdivided the interval using the "*remscheidensis"* group. Andrew Simpson (University of Queensland) presented an outline of the Silurian conodont faunas from the Jack Formation of northern Australia.

This session was followed by two offerings from the Early Devonian. Jose Ignacio Valenzuela-Rios, Universitat Valencia) presented a reinterpretation of the *"A." eleanore* lineage and Pierre Bultynck (Institut Royal Sciences Naturelles de Belgique) presented data on the facies relationships of Emsian to Eifelian conodonts (*dehiscens* to *partitus* zones) from Morrocco.

A bracket of three papers followed under the title of "Studies of general interest on Devonian conodonts" that focussed on the higher parts of the column. Bill Kirchgasser (Department of Geology, State University of New York) reported on the biostratigraphic implications of the widespread discovery of "North Evans" conodont faunas. Willi Ziegler (Forschungsinstitut Senckenberg) undertook a review of recent developments in high resolution conodont biochronology in the Devonian noting it was more useful than sequence stratigraphy, graphic correlation or alternate zonal schemes, and tying their phylogenetic-zone concept to recent radiometric data. Charles Sandberg (United States Geological Survey) reported on the use of conodonts in establishing the timing of the Late Devonian Alamo Impact Meggabreccia.

A break in the flow of conodont data followed with a session dedicated entirely to IGCP421 contributions, three of which focussed on microvertebrate remains and one on brachiopods from the Early Devonian of the Anti Atlas region of Morocco. The microvertebrate papers covered the Early Devonian of Tyers-Boola area of Australia, the Devonian to Early Carboniferous of the Carnic Alps and the Devonian of Mauritania. Many of the IGCP421 microvertebrate studies have resulted as a by product from sequential sampling associated with refined biochronological conodont investigations. The exception was the Mauritanian study whereby microvertebrate data

resulted as a by product of a review of Devonian chonetid brachiopods. The geographic and phyletic scope of IGCP421 gives ample opportunity for the integration of vast swathes of palaeontologic data.

Later in the afternoon attention refocussed on the Late Devonian with a series of biostratigraphic contributions. Gilbert Klapper (Department of Geology, University of Iowa) compared the original 13-fold Frasnian conodont zonation based on the Montagne Noire sequence with 9-fold "standard" zonation of the German and Great Basin sequences, highlighting taxonomic and methodological differences. This offering generated the most biostratigraphic "heat" of the meeting. Willi Ziegler (Forschungsinstitut Senckenberg) presented conodont data through the Frasnian Famennian boundary of the Rheinisches Scheifergebirge. Immo Schülke (Institut für Geologie und Paläontologie der Universität Hannover) presented conodont data on the early Famennian of the Montagne Noire. Norman Savage (Department of Geological Sciences, University of Oregon) completed the session with a report on Late Devonian conodont faunas from Timan.

The scientific sessions for the day were concluded by a small bracket of papers moving higher up the column to the Carboniferous. Tamara Nemirovska (Ukrainian Academy of Sciences, Kiev) presented phylogenetic data on *Gnathodus bilineatus* from the Rheinisches Scheifergebirge. Glenn Merrill (University of Houston) presented biostratigraphic analysis of *Neognathodus* and Peter von Bitter (Royal Ontario Museum, Toronto) presented a reconstruction of *Gondolella* from Illinois. At the end of the second day, the moveable feast shifted location to the University of Modena.

Cooler conditions prevailed in Modena and the last day began by revisiting older parts of the column with a large batch of papers concerning Ordovician conodont faunas. Jerzy Dzik (Polish Academy of Sciences, Warszawa) reported on Ordovician climate modelling on conodont data from the Holy Cross Mountains. Chris Barnes (University of Victoria) drew together a vast array of circum Laurentian Late Ordovician conodont data into a regional biofacies synthesis. Oliver Lehnert (Universität Erlangen-Nürnberg) reported on middle Ordovician faunas from Argentina. Stig Bergström (Ohio State University) reported on some Late Middle Ordovician conodonts from Norway with Laurentian affinities, this palaeogeographic anomaly indicated the potential of geochemical studies (particularly neodymium) in unravelling puzzles of provinciality. Sven Stouge (Geological Survey of Denmark and Greenland) made some observations and inferences on the suprageneric taxonomy of some Ordovician lineages.

After a short hiatus consisting of messages of welcome from the Congress President, the Chancellor of the University of Modena and the Head of the Department of Earth Sciences, the scientific sessions reconvened with a focus on Carboniferous and Permian biostratigraphy. John Talent and Ruth Mawson (Macquarie University, Sydney) presented some Carboniferous conodont data from northeastern Australia permitting some stratigraphic realignments. Anna Somerville (University College, Dublin) presented data on three upper Viséan sections from Ireland. This was followed by two papers on Late Carboniferous conodonts from eastern Europe; Tamara Nemirovska (Ukrainian Academy of Sciences, Kiev) on faunas from the Donets Basin, Ukraine, and Alexander Alekseev (Moscow State University) on faunas from the Moscow Basin. The final offering was from Bruce Wardlaw (U.S. Geological Survey) on Permian faunas from the Salt Range, Pakistan.

The next session consisted of a clutch of three papers from the highest parts of the column. Heinz Kozur (Budapest) reported on the Permo-Triassic biotic crisis. Selan Meco (Universiteti Politeknik, Tirana) covered the Triassic of Albania and Mike Orchard (Geological Survey, Canada) reported on Triassic multielement gondolellids.

The final scientific session of the conference returned to the opening palaeobiological theme. Richard Krejsa (California Polytechnic) expressed his biological concerns about basal bodies. Kim Freedman (University of Leicester) discussed the taphonomy and function of the *Promissum* apparatus. Phil Donoghue (University of Birmingham) resolved the paradox of growth and function in conodont elements with a study of internal discontinuities. Mark Purnell (University of Leicester) built on knowledge of form and function of conodont apparatuses to undertake a broad trophic analysis. Karsten Weddige (Forschungsinstitut Senckenberg) produced a "scissor and basket" model for Lower Devonian spathognathodid apparatuses.

Apart from the oral presentations there were a large number of high quality poster presentations mostly covering biostratigraphic issues, but also including biofacies analysis, thermal analysis, palaeobiology and palaeogeography.

In many ways this ECOS was one of consolidation of the primary biochronologic utility of conodonts. Unlike some previous ECOS conferences that have sparked a revolution in scientific thinking about conodonts and generated passionate debate both during and outside of scientific sessions (such as multielement taxonomy - ECOS 1, zoological affinities - ECOS 4), or held out promise of new insights through geochemistry (ECOS 5), this conference was dominated by the traditional appli-

cations of conodontology. This does not imply that ECOS 7 was any less significant than previous events. Quite the opposite, in fact, the vast array of new data demonstrates the intrinsic international strength of modern conodont research. Conference organisers are to be congratulated for developing a scientific program that demonstrated conodont research continues to gather momentum across a broad range of geological and biological applications. The organisers were also responsible for producing a social program that can only be described as breath-taking in scope and style. This program acted as an excellent catalyst for collaborative international communication and will be a hard act to follow for future ECOS organisers.

The IGCP421 project meeting benefited enormously through its concurrence with ECOS 7. Nine of the 108 conference abstracts, principally those dealing with other fossil groups, were specifically marked as exclusive contributions to IGCP421. The vast majority of the papers presented, however, were directly relevant to IGCP421 project outcomes as they dealt with high resolution Palaeozoic biochronology and inter regional correlations of direct relevance to the north Gondwana margin. This project continues to generate an enormous volume of data and foster the international collaboration essential for the ambitious synthesis to follow.

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ECOS VII: Pre-Symposium Field Trip to Sardinia, June 18-22

The pre-symposium field trip was well subscribed to, with 29 conodont workers from 10 different countries in attendance, together with a variety of accompanying persons, bringing the total number to 34. By one o'clock in the morning of the 19th everyone was safely installed in the hotel, fed, watered (wined and Mirtoed), and in some cases wondering when (or if) lost luggage was going to arrive. Breakfast was at 7.30am that morning, and by 8.30am everyone was ready, with their newly acquired ECOS VII rucksacks (and ECOS VII T-shirts in the case of a luggageless Anita Harris), for a day in the field. The bus arrived to take us on our way to the first of many localities, the Late Ordovician of Cea Brabetza near San Basilio. This first locality was some way up a small track and so the coach was abandonned in favour of minibuses, lest the conodont workers and their friends should have to walk too far in the Sardinian sunshine. After a detailed explanation of the geology and conodonts by Annalisa Ferretti, Enrico Serpagli, Francesco Leone and Alfredo Loi (with occasional translation by Gian Luigi Pillola), the roadside outcrop of Late Ordovician (?Early Silurian) was sampled by those with a penchant for rocks of this age, whilst those who weren't of this persuasion caught up with old friends, and others (myself included) sought to make new ones. One strange feature of this particular locality was the police escort, who did seem to enjoy the geology, so no-one was perturbed by his presence. The minibuses delivered us safely back to the coach, and there was just time to fit in a quick espresso before we were whisked away to the next locality.

Moving into the Silurian and a location 500m east of Silius Village, stop 2 was reached by a 200m walk through some fields along a path that was kindly cleared by the farmer and two helpers with a mower and some rakes. The thistles here were a bit viscious, but we had been warned about the local wildlife (spiders and scorpions) and trousers were worn by all throughout the field trip. Sample bags and hammers at the ready, we listened as Enrico Serpagli, Carlo Corradini and Annalisa Ferretti described the geology and conodonts with the aid of some finely crafted posters. More samples were taken, and yet more sunblock was applied as the sun rose further into the cloudless sky.

Staying in the Silurian, the third locality of the day featured some more "Ockerkalk" nodular limestone with loboliths in a roadside outcrop some 50m from a layby where the coach parked. The enthusiastic reached the level of the loboliths in the road-cut, and others discussed the outcrop closer to the base of the section. By this time stomachs were beginning to rumble and we were all looking forward to a spot of lunch. After a short drive we had to walk approximately 200m to a small farmhouse, where we were greeted by the (soon to become familiar) smell of barbecued suckling pig. To some extent this was a taphonomic exercise as we were invited to study some of the roasting piggies' *pre mortem* colleagues in a nearby enclosure. Inside the farmhouse we were given the chance to become more closely associated with one another, largely because of the limited amount of space allotted per person for seating. Plates were distributed and olives, ham, cheese and bread were eaten with gusto, accompanied by ample wine and water. Course two was a huge vat of pasta of which we ate our fill, accompanied by yet more supplies of wine. We were not to be disappointed as the third course arrived in the form of the barbecued suckling pig and plenty of fresh salad. For the vegetarians amongst us, this must have been a trifle difficult to cope with, and even for the omnivorous Dick Aldridge, the meal proved too tough for his dental apparatus. Dessert was

Its a tough life, but as you can tell, the outgoing chair and his conodont colleagues are bearing-up to the strain of it all, examining sections through the Lower Ordovician of Sardinia during the Pre-ECOSymposium field trip. Left to right: Dick Aldridge, Norm Savage, Anita Harris, Glenn Merrill, Jerzy Dzik, Chris Barnes, Enrico Serpagli, Annalisa Ferretti & Alda Nicora.

Clearly, there is some difference of opinion over the precise location of the conodonts! Some of the faces visible from right to left are: Viive Viira, Gabriella Bagnoli, Cristina Perri, Chris Barnes, Hans Peter Schonlaub, a series of indeterminate backs, Barry Fordham, Ruth Mawson and Annalisa Ferretti.

fresh fruit and some little almond flavoured cakes and biscuits, with coffee to finish. An International incident was narrowly avoided when Viive Viira *almost* had to forgo coffee due to the eagerness of the organisers to continue with the scheduled localities, but the situation was soon remedied, and a large "Thankyou" was expressed by all to the "Major" of the town, who had provided us with such a splendid meal. We walked back to the bus, slightly slower than we had left it, and set off for the last locality of the day.

A slight leap up the stratigraphic column took us to the Late Devonian (Famennian) near Villasalto village where two sections were examined. Carlo Corradini and Gian Luigi Pillola provided us with yet another superb explanation of the geology before we embarked on possibly the most strenuous walk of the day, which actually involved a slight incline, and a scramble up an earthy slope through some fairly dense vegetation. More samples were taken, and people marvelled at the climbing expertise of the younger Repetski (Rocko, age 12) as he scaled to some nerve shattering heights. Refreshments were handed out from the back of the minibus, as the combination of the heat and the wine at lunchtime started to take its toll. As the sun slid a little lower towards the horizon, we congratulated the Italian organising team for a wonderful first day whilst sitting on the terrace of a lovely bar sipping the drinks kindly bought for us by the "Major" of Villasalto. After showers and a brief rest back at the hotel in Senorbï, and a phase of 'regeneration' for the Chief Panderer at the local dentist, we were treated to an *al fresco* meal and some traditional dancing, courtesy of the "Majors" of two villages close to Senorbï.

Day two began in the Cambrian Cabitza Formation of southwest Sardinia, where the conodont faunas have been completely remineralised and are apparently a fetching shade of green due to diagenetic replacement of the original phosphate with a clinochlore mineral. Again the sun was shining, with the temperature soaring even higher than the day before. Leaving the outcrop slightly depleted in parts, we continued past some very large mine workings, and on to the next locality.

The type-section of the Iglesias Group (Lower Cambrian - Tremadoc) was the location of the next stop, however no conodonts have been recovered from this outcrop. The trilobites were also hiding, and so the party inspected the sedimentary features of the section before making their way back to the coach some 100m away. Due to some road closures, one locality had to be missed out, and so the rest of the Cambrian was abandonned in favour of the Silurian once more. Another field near Fluminimaggiore was the location of the third stop. The small, but very attractive exposures of "Orthoceras Limestone" (Wenlock-Ludlow) were examined, but only after a little over-exertion by some of the more keen members of the group, who by-passed the entrance to the field and had a close encounter with a steep hill before reaching the outcrop. Everyone was impressed by the macrofossils (nautiloids, graptolites and bivalves), and once again by the quality of the posters used in the description of the outcrop. As the sun rose, and more people were found lurking in shady places under trees, thoughts of a light lunch spurred us away from the outcrop and back to the bus.

A lunch of gargantuan proportions was once again laid out in front of us, accompanied by plenty of wine and water, and featuring a main course of suckling pig, but only after plates of cold meats and anti-pasta had been finished. The fresh fruit for dessert eased our calorie-consciences somewhat, and the small, but caffiene-rich, coffee finally made our passage back out into the field possible. No trips to the dentist were organised for later on.

The last geological stop of the day was at an Early Devonian section near Fluminimaggiore. The 14m outcrop was well exposed, and to the relief of some there were trees to offer shade from the afternoon sun. The outcrop of limestones and mudstones contains an abundant conodont fauna, together with a variety of other macrofossils from the *delta* Zone of the Mason Porcus Formation. As per usual, samples were enthusiatically collected before our return to the bus, where Gian Luigi and Alfredo provided us with some impromptu water flinging entertainment in a horse trough.

It is not possible to visit an island such Sardinia and concentrate solely on the geological aspects of the place, and so a slight deviation into archaeology concluded the day. The location was a "Nuraghe" settlement dating back to between the XIII and IX centuries B.C. These megalithic settlements consist of a large central cone-shaped tower, surrounded by, and connected to, five smaller towers. The main tower complex has a "town" built around its margin on the opposite side to the main valley. A guide took us round the settlement, and allowed us time for questions at the end. A pertinent question was posed by Barry Fordham, on the subject of symbolic statues and the relevance of the number of breasts these possess. The answer is, for those of you who are interested, that most female statues have two breasts, but some represent an androgenous condition and only have one. All in all, an interesting and pleasant evening was shared by all, and we returned to the hotel intellectually enhanced, and musically stimulated by the Italian contingent, Nacho and Stina Merril, who serenaded us for the whole journey from the back of the bus. Dinner was served in the hotel at Senorbï, and yet again proved to be more of a banquet

than a simple meal. We were finally ejected from the restaurant at 2am, after many enjoyable conversations concerning conodonts, and pretty much everything else, our vocal cords well lubricated by wine and myrto.

The third day took us back to the southwestern part of Sardinia. The first stop was in the Late Ordovician of Cannamenda, where two trenches had been dug in a field to expose the Punta S'Argiola Member of the Domusnovas Formation. The richest Ordovician conodont fauna to be found in Sardinia is to be found here, but is only found in, to quote the guidebook, "the thin fossiliferous horizon (4-4.5cm) [which] has no lateral continuity and is poorly exposed in the form of small sparse pieces in the field." Its only redeeming feature is that it is a "distinctive" colour pink. Much limestone was collected at this locality, though much was returned to the outcrop before departure because is failed to meet the exacting standards pinkosity set by Annalisa. We continued from the Ordovician back up into the Devonian at the next locality. Of all the outcrops we visited, this was the most original, in that it appeared to be a loose block set in the hedge between two fields. Nevertheless, conodonts have been collected from here, and are important because they represent the only Middle and Late Devonian faunas collected inthe SW part of Sardinia. Some of the flora was also investigated here, and Alfredo explained that some of the thistle-type vegetation wasn't thistle, but was a variety of wild artichoke. They were still quite prickly though.

We then moved back to the Silurian "*Orthoceras*" Limestone again for the third locality of the day, before slipping into the Cambrian Gonessa Formation for a spot to eat. The venue for this "light meal" was a restaurant next to an enormous cave complete with a road running through it. Well, lunch held few surprises with the usual cold meat, anti-pasta and suckling pig courses, but an added bonus here was the first sampling of the infamous Italian icecream. It is every bit as good as its reputation suggests. Absolutely mouthwatering. Enough of this, I can feel the calories piling back on!

After lunch part of the group decided that the cave could not be left without being explored, and so wandered into the cave entrance. Inside we saw some amazing cave structures; enormous stalactites and stalacmites, and found that the temperature was perhaps 20 degrees cooler than outside of the cave. We strolled on for about a mile, almost reaching the other end of the cave before being rounded up and herded back to the coach in the minibus. The blame for this expedition was placed firmly on the head of Godfrey Nowlan, and the rest of us were let off with a stern look for disrupting the schedule. It was well worth the look though.

The last part of the day was spent travelling to and around some of the coast of SW Sardinia with some amazing views over the mineworkings, and down past the purple cliffs to the clear blue sea. The Sardic Unconformity, described by Cocozza as the "most beautiful unconformity in the World", and to this day known to Italians as "La Discordanza", was the last place to be visited. Upper Cambrian laminated shales of the Cabizta Formation are overlain by boulder-bearing conglomerates of the Ordovician Monte Argentu Formation, and the unconformity is definitely as attractive as any I have seen. The surrounding scenery, the cliffs and clear Mediterranean Sea, only add to the general beauty of this part of Sardinia.

The return to Senorbï heralded yet another huge meal at the hotel. This was seafood at its best with a whole range from molluscs to crustaceans and fully-fledged pisces. The main course fish had interesting crushing dentition, some of which was disected and brought home by Phil Donoghue. The after dinner entertainment arrived in the form of a joke telling session chaired and dominated by Rocko Repetski, with ample encouragement from Dick Aldridge and Andrew Simpson, an apparent continuation of some festivities at lunch time.

Our last day in Sardinia began with a visit to some Ordovician localities, and some of the steepest walks of the week; not necessarily a bad thing after all the eating. The outcrops at Umbrarutta (between Donigala and Lago Mulargia) yield the best preserved Ordovician faunas found in Sardinia; the last samples of the week were collected, and we finished the geological part of the field trip. A long coach trip lay ahead of us to the western coast, and to the archaeological ruins of Tharros which was to be the last official locality to be visited in Sardinia (apart from a quick snack for lunch of course).

The city of Tharros was founded in the 8th century B.C. by the Phonecians, but the area is known to have been home to various Nuraghe settlements from as early as the 14th Century B.C. It was taken over by the Carthagenians during the 6th century B.C. and became a maritime stronghold from where the Sardinian sea was dominated. The city was lost to the Romans during their conquest in 238/237 B.C. and finally ceased to be a city in 1070 A.D. A guide showed us round the different parts of the city, and we grabbed a last chance to do some geology by studying the basaltic blocks used to construct the city. The site is still being excavated, so will probably grow in the next few years. The view towards the west towards the Stagno di Mistras was discussed in detail too, as it appears to hold some recent evaporitic deposits, but our schedule was too tight to fit in a visit. After leaving Tharros, Peep Mannik managed a quick foray towards the sea, where he went paddling without removing his shoes. The rest of us looked on

enviously, and by all accounts, the water was fantastic. Some souvenir buying was accomplished before we made our way back to the bus and towards the last lunchtime extravaganza of the field trip.

A short drive to a near-by village provided us with our last lunch stop, and yet again our eyes were proved too big for our bellies. The seafood meal was fantastic, once again, and the wine flowed freely. Dick Aldridge gave a speech at the end of the meal to thank the Italian organising committee aided and abetted by Norman Savage's helpful suggestions. We all heartily aggreed that the trip had been an enormous success, and raised our glasses to the people who had been involved in its organisation. After the speeches we left for the airport, at first without Repetski Junior who came hurtling out of the restaurant when he heard the sound of the coach pulling away. Strangely John was not the first to notice Rocko's absence. A full compliment of people was finally reached, and we set off for our journey to ECOS-proper at Bologna and Modena.

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ECOS VII: Post-Symposium Field Trip to the Southern Alps, June 27-July 2

Led by experts from the University of Bologna and their colleagues from the Universities of Milano, Modena and Pisa, this 5 day excursion crossed the Southern Alps belt from East to West, beginning with the Carnic Alps, famous for their mostly unmetamorphosed Palaeozoic successions, and progressing toward the Dolomites and Lombardian Prealps.

On the first day of the trip, the party visited the Triassic Aupa section where the Ladinian/Carnian boundary is exposed. Heavy rains prevented the examination of the only Ordovician section included in the excursion's schedule. The weather improved in the afternoon, however, and it was possible to visit at least one of the three programmed Upper Devonian sections in the Monte Croce Carnico Pass area. At the visited section, where a part of the Lower Carboniferous outcrops, a stimulating discussion arose about the phylogenetic lineage of *Gnathodus praebilineatus*.

The second day was devoted to the examination of some Middle to Upper Devonian sections in the Pramosio area (Central Carnic Alps), including one section where the Frasnian/Famennian boundary is very well exposed. On the third day, the participants visited one section displaying the Tournaisian/Visean boundary and left the Carnic area for the Dolomites. There, they examined Lower and Middle Triassic sequences, including the Dont locality known for being the site in the Southern Alps from which Middle Triassic ammonoids were first described in the last century.

The entire fourth day was spent in the Dolomites where the beautiful mountain scenery famous all over the world enchanted the participants perhaps as much as the Ladinian sections visited near the Gardena and the Sella Passes. At the Bulla section where the Permian/Triassic boundary is well exposed, an interesting discussion developed on the boundary itself and on the evolutionary trend of the topmost Permian-lowermost Triassic conodonts.

The last day was devoted to the Lombardian Prealps with a final stop to visit the Bagolino Anisian/Ladinian succession.

All participants enjoyed traditional Italian regional cooking and hospitality; indeed so much so that the gratified organizers were led to believe these were the main reason for the Symposium's success!

M Cristina Perri & **Claudia Spalletta** *Department of Geological-Environmental Earth Sciences, University of Bologna, Italy*

ECOS VII: Sardinia Field Trip Guidebook

Seventh International European Conodont Symposium Serpagli, E. (Editor) *Special Issue Giornale de Geologia*, Seria 3, Vol. 60, 215pp.

I didn't go to ECOS VII so it was a nice surprise when the field trip guidebook arrived in my in-tray to review. A quick flick through revealed a high quality publication with excellently reproduced diagrams and plates. However, the question that remained was, "could it quickly and easily be used as a guidebook in the field?"

The guidebook is split into two main sections; reviews/taxonomic notes and descriptions of field localities. My instant impression of the text was that there were an unusually high number of typos and the use of English was somewhat quirky, for example in places limestones were described as siltitic or alterated. Despite this, the review articles were just about the right length for a field guide and each provided ample opportunity for further reading once back at home. Several new taxa were described so that they could be referred to

later in the guide. These descriptions were very brief and left me hoping that the full descriptions (to be published in the conference proceedings) arrive soon.

What I really liked about the excursion sections was that some of the stop descriptions provided a list of beds that would produce good faunas both in terms of taxonomical diversity and numbers of conodont elements per kilogram of sample collected. For conodont workers it is often a difficult choice to make in the field to decide which samples to take while on the other hand thinking about just how many Kgs it is possible to take back in your hand luggage! Unfortunately not all the stop descriptions had suggestions for sampling, although the excellent maps and illustrations of logged sections left me with the belief that I wouldn't get lost if I ever went sampling in Sardinia.

I also liked the occasional interspersed sections on local geology of "non conodont bearing rocks" for example descriptions of Cainozoic volcanicity and also brief descriptions of the archaeological history. It can be easy to forget that the area has had both a varied geological and archaeological history when you go out into the field intent on sampling for conodonts with a large hammer and chisel.

I think that I would have liked to have had more quantitative information in this guidebook to help me decide which samples to take. Otherwise, this guide book has been well put together and could be used quickly and easily in the field with my only worry being that it would have spoilt the glossy publication by taking it into the field. I hope that when the conference proceedings are published, they live up to the promises provided by this guidebook.

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ECOS VII: Southern Alps Field Trip Guidebook

Seventh International Conodont Symposium held in Europe

Perri, M. C. & Spalletta, C. (Editors) *Special Issue Giornale de Geologia*, Seria 3, Vol. 60, 344 pp.

How times change. Not so long ago the best one could hope for from the guides which accompany field excursions was a few sheets of xeroxed paper held togther by a staple, or, if one was lucky, two staples. This type of guide invariably disintegrated when the rains fell on the first day. Now many of the tomes emanating from the organisers of field trips held in the last years of the 20th century are magnificent volumes fit to take their place on priveleged bookshelves alongside copies of 'Early Vertebrates' and complete sets of the Treatises on Invertebrate Paleontology. The last thing one wants to do nowadays is to actually take these things out into the field, and this in itself might be looked upon as a criticism. However, the advantages of producing such a comprehensive review of the conodonts and stratigraphy of the critical and historically important region of the southern Alps far outweigh its usefulness or otherwise in the field.

So what of the Southern Alps Field Trip Guidebook (Giornale di Geologia Serie 3a, Special Volume 60, 1998)? Well, I hesitate to use the word 'magnificent' but this is indeed a fine book, compiled to accompany the excursions organised for ECOS VII, the seventh international conodont symposium held in Bologna, Italy in June/July 1998. Much credit must go to the editors, Maria Christina Perri and Claudia Spalletta, who have persuaded or cajoled contributors into delivering an admirable coverage of conodont occurrences from the Late Ordovian to the Middle Triassic, not to mention a detailed and very useful series of discourses on the stratigraphical background. The book demands to be assessed on its obvious merits, but even detailed scrutiny fails to reveal any major flaws.

The format is soft covers, A6 size with no less than 329 pages and innumerable plates and diagrams (not listed anywhere unfortunately). The standard of printing is high, but some of the text-figures suffer from being too 'busy' or overreduced and a few plates are dark and conodont element detail obscure. But overall the reproduction is excellent and the style 'user-friendly'. Chapters are not designated but instead the book is divided into 10 introductory sections followed by 21 'papers' on the individual stops or localities. A generally successful attempt has been made to standardise the format of each paper in the localities section, but minor little variations in the use of headings are vaguely irritating. For a random example, in section Stop 1.4, we see headings on Location, Lithology, Conodonts, Environment and Additional Remarks, but in section Stop 4.1 the headings are Location, Lithostratigraphy, Ammonoids, Conodonts and Age. A historical outline is included in some chapters, but not others. There are some spelling errors and the English in some sections is rather clumsy, but these are small complaints.

As for the science, that very much depends in which camp you sit. Perhaps a guidebook is no place to discuss detailed taxonomy, but the preponderance of conodont subspecies recorded from throughout the Devonian and Carboniferous and the increasing introduc-

tion of subspecies elsewhere in the column indicates either varied and diverse populations of closely related taxa, or the unneccesary division of variable populations of a few genuine species. And what exactly is a subspecies? As they say, you pays your money ..... Also, an understandable bias has been made towards the more distinctive and stratigraphically useful Pa elements, and sometimes the Pb elements, but there is also a regrettable lack of reference to multielement taxonomy and other elements in natural species apparatuses. In a guidebook of the type described in the first few sentences of this review, it would be inappropriate to raise such points, but in such a admirable and already important book, perhaps such matters might have been addressed.

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Mass Extinctions and their Aftermath

A. Hallam & P.B. Wignall. Oxford University Press, Oxford, 1997, 320pp.
ISBN: 0-19 854917-2 (Hbk) 0-19 854916-4 (Pbk)

Coincident with the closing phase of IGCP 335 "Biotic Recovery from Mass Extinction Events", Hallam and Wignell have generated an interesting contribution to the debate on the causes of mass extinctions. This readable account provides an easy introduction to the subject and presents 50+ pages of up-to-date references for anyone wanting to probe further into the subject.

The layout of the book is almost predictable - with an introduction, accounts of the major events, and a final chapter in which the causes of mass extinctions are documented. Throughout there is a good range of diagrams, all of which are simple, clear and informative. Many have been produced for the book, while others are taken for a range of key publications. There are a number of black and white photographs in the book but unfortunately these have not reproduced at all well. They are, however, not critical and one might debate why they were included.

All fossil groups (including microfossils) get an even-handed treatment and this ensures a much wider readership. It is also a pleasure to see data from such a wide range of fossil groups being used in concert and I am sure that the students who read the text will be encouraged to work in a similar manner later in their careers.

Experts in any field of interest will, no doubt, be able to point to "key references" that have been omitted (eg. Coccioni *et al*.'s contributions on the Breistroffer/ Amadeus events in the late Albian and Breheret *et al*.'s work on the Paquier event at the Aptian/Albian boundary) but that would be a little unfair. It is also likely that experts in any particular fossil group might be able to spot the occasional mis-use/mis-interpretation of published data. An example of this would be the species diversity plots of the British Lower Jurassic where the authors use the foraminiferal data from the "stratigraphic atlas" of Jenkins & Murray (1989) as though it gives a true measure of diversity, rather than just the authors' selection of a few key taxa. Using the *real* foraminiferal data the authors would have obtained a more convincing argument!

Minor queries aside the book provides a comprehensive review of many of the great controversies including the P/T and K/T boundaries and, in the final chapter, there is a clear exposition of (nearly) all of the proposed extinction mechanisms. Much of this information is presented in a pleasantly unbiased way. Some things are, however, not discussed! The Lakagigar eruptions in Iceland in 1783-84 (p. 245) are mentioned but there is no comment about the synchronous eruption of a Japanese volcano and the (relatively) short-lived climatic changes these caused (Grattan, 1995). Scaled up to Deccan Trap volumes, and coupled with a near-equatorial position, the climatic effect could have been significant. Of equal concern is the lack of critical questioning of some of the other extinction-causing events.

I can thoroughly recommend this book to all palaeontologists, stratigraphers and those involved in the extinctions debate. It provides an easy read, even for those not fully aware of all the latest controversies and - as such - is an ideal undergraduate / postgraduate text.

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Selection: the mechanism of evolution

Bell, G. Chapman and Hall 1997. 699pp; £59.00; ISBN 0-412-05521-X (Hbk).

The basics of selection

Bell, G. Chapman and Hall 1997. 378 pp. £30; ISBN 0-412-05531-7 (Pbk).

Since natural selection is the most important process in the universe, it is surprising that Graham Bell's *Selection: The Mechanism of Evolution* is the first textbook to be devoted to it. Bell complains that most school and university textbooks on biology follow roughly the same path, from a few pages on the structure of DNA to the Hardy-Weinberg equilibrium to a bit on population genetics and an account of the peppered moth. The following 400 pages or so document the vastly complex and rather squidgy world of animals and plants in nature, which might as well have some other explanatory basis. There is an element of truth in this. While I have nothing against the traditional "natural history" approach as a way of teaching life science, it is true that, insofar as students are interested in selection, they must generally be content with the bare bones of Darwinian logic and a picture of the bearded sage.

Not any more. The basic aim of Bell's textbook is to explain all the phenomena of evolutionary biology as logical consequences of the intricate workings of selection. There is a lot I like about the book, and just one aspect I have reservations about.

On the plus side, *Selection* is long and well structured and makes continual reference to experimental data to demonstrate the various principles that are gradually introduced. We start with a good review of the elegant work done on RNA replicators, then consider selection on single characters, multiple characters, autoselection (that is, transposons etc.), interactions between individuals and species, including coevolution, and finally sexual selection. The choice of material included seems to be judicious, because despite the book's length and engrossing level of detail, it never gets bogged down by repeating points or principles. In fact, it is a mine of information.

An endearing feature is that many of the basic experimental results reported by Bell are 50 years old or more. For example, if you want to know what would happen if you selected flat out for body size in mice for 30 years non stop (and who doesn't?), you must get dusty in the library or buy this book. This is both heartening and disappointing, because it is good to see that the heroic work of the past still counts for something, but it also undoubtedly reflects badly on the short-termism of modern science.

My reservation is that *Selection* is, if anything, too ambitiously logical in structure. Bell's approach is basically "axiomatic", in that he seeks to build principle on principle, establishing each step as a sort of truth, and exploring its implications. But while some of the principles are incontrovertible, others are experimental generalizations of possibly limited applicability, and still more are really just interesting postulates. This makes the axiomatic approach only partially successful.

In fact, almost all of the 175 section titles would make good essay questions, to which the word "Discuss" could be appended. Here's just one from each chapter, which give a flavour of the book. "Selection acts directly on the rate of replication"; "Selection for genes with independent effects is more effective when they are transmitted independently"; "Continued selection on one character causes a general regress of others"; "The environment always tends to deteriorate"; "Sexual selection is competition among gametes for fusion". Perhaps we could make some biological fortune cookies from all this!

If you are an ultra-Darwinian pan-selectionist, you might conceivably be disappointed by the scope of the book. Except for one section on artificial life, there is little attempt to investigate how the principles discussed transfer to other spheres in which selection rules, most notably cultural evolution.

Finally, it is necessary to ask whether there is anything in this book of specific interest to micropalaeontologists. For those working mainly in stratigraphy and biofacies, then the answer is: not really. For those interested in evolution, then the answer is certainly yes. Let us proclaim with pride that *we* are able to produce the best documented and most detailed records of how evolution proceeds over vast periods of time in natural conditions! Bell's *Selection* is a good and readable review of the processes that, we suppose, must have produced the patterns we retrieve from the fossil

record. The difficulty as always is bridging the gap between pattern and process. Maybe Bell can be persuaded to look at the microfossil evidence in time for the second edition, or even refer to some of the classic work of, say, Kellogg or Malmgren.

One last point. Curiously, a shorter cheaper version of the same text has been produced simultaneously called *The Basics of Selection*. On no account can I recommend the purchase of this version, because it is a false economy. What has been cut out to make *The Basics* is all the interesting experimental results and, would you believe it, all the literature citations! That leaves the logical structure very exposed, which as mentioned might be a bit wobbly in places.

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Geology and mineral resources of Estonia

A. Raukas and A. Teeddumäe (eds): Institute of Geology, Estonian Academy Publishers, Tallinn, 1997 ISBN 9985-50-185-3. £89.00.

The editors foreword to this book states that "there are no current published general surveys on the geology and mineral resources of Estonia". Over the past 150 years of geological study at Tartu University and latterly at the Estonian Academy of Science there have certainly been many hindrances to geological study such as a chequered political past under Swedish, Polish and most recently, Russian rule. This book certainly goes a long way towards filling that gap and provides a much needed review of old Russian literature incorporating all the latest papers written in English.

The book covers Precambrian to Devonian stratigraphy and then goes on to describe the Quaternary cover. Estonia has long been an important area for the study of Palaeozoic stratigraphy and microfossils. Murchison published a report on the Silurian of Estonia and the first description of conodonts by Pander was based partly on specimens recovered from Saaremaa Island on the East Baltic coast. Many hundreds of boreholes drilled under Russian occupation have provided an "in depth" knowledge of subsurface stratigraphy. Consequently the area has been used to solve many problems in Palaeozoic stratigraphy and in the taxonomy of both macro and microfossils.

Following chapters on hydrogeology and tectonics, the preceding chapter is entitled "Formation of the territory" and covers the evolution of the sedimentary basins in which the sedimentary cover was deposited. Within this chapter there is also a brief review on each of the fossil group studied. Of interest to micropalaeontologists there are sections on chitinozoa, ostracods, conodonts and other micro-vertebrates. These include details of regional biozones and biostratigraphic data alongside well drawn lithological sections. The Quaternary section includes minor references to marine microorganisms (diatoms, foraminifera, radiolaria and ostracods) but the pollen stratigraphy of Late Glacial deposits is covered in some detail.

A short archaeological section is followed by a review of Estonian mineral resources. There are reviews on the Ordovician Oil and Alum Shale opencast mining. Other mineral resources covered include phosphorites, peat, sand, gravel, glacial clays, Fe, Pb, Zn, Cu, U ores and the Palaeozoic limestones that have been used as building stones for walled medieval cities such as Tallinn. The final chapter of the book deals with geological monuments which include some of the largest erratic boulders in northern Europe and a review on the genesis of meteorite craters.

I have a few minor quibbles with the book particularly the use of chronostratigraphic terms such as stages and substages when describing the history of geological research in Estonia. The main criticism that I have is in the use of Russian both within the text and the reference section. In this book, any reference that was originally written in Russian is referenced in Russian both in the text and in the reference section. Sometimes it is easy to figure it out as the western name appears in the text beforehand, for example "illustrated by Viira (1982)" but this is not always the case. When you look up (1982) in the reference section you find the reference given entirely in Russian which makes it very difficult to look up in the library or request as an inter-library loan.

As a lower Palaeozoic ostracod worker I could not help but notice the miss-spelling of the ostracod genus *Beirichia* (should be *Beyrichia*) throughout the book. Perhaps this just reflects the research interests of the editors? However, the editors can be congratulated for the fact that English remarkably consistent throughout the book considering the number of individual contributors and the fact that English is not their first language. In this respect the book more than fulfills its remit, provides a much needed review of the Geology of Estonia and is a must for the bookshelf on any worker interested in the Geology/Palaeontology of Estonia or indeed any Palaeozoic worker.

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Vertebrate fossils and the evolution of scientific concepts:

A tribute to L. Beverly Halstead

W. A. S. Sarjeant (ed.). Gordon & Breach Publishers, 1995, 622 pp. ISBN 2-88124-996-5. £78.

Bev Halstead was a man of eclectic tastes and interests, and 43 contributors have produced a volume comprising 35 papers which reflect this, in memory of his life and of his life's work. The papers concentrate on the more scientific aspects of a man who was equally at home in politics and philosophy. Perhaps for this reason, one of the most interesting chapters is Sarjeant's opening biography– fifty six pages of one man's scientific excellence, rebellion, iconoclasm and humour. In support of that claim for eclecticism is the second chapter, a bibliography of Halstead, in which the incredible productivity also comes into focus. In the normal manner, letters are appended to years in which there is more than one publication (all of them from 1954 until his death). Many of the years run through beyond 'm', and 1988 makes it to '1988z'. One section of the 1987 list provides an illuminating insight to his range, with 1987o-1987s comprising an open letter on Soviet seismology to President Gorbachev, contributions on University politics, a paper on the natural sciences and Marxism and a review of the early evolution of neural crest-derived skeletogenic cells.

After the opening biographical papers, the remainder are divided into the major themes of Halstead's scientific endeavours: Palaeozoic fish, the history of reptile palaeontology, dinosaurs, vertebrate ichnology, marine reptiles and fossil mammals. Few of these will be of direct interest to micropalaeontologists, although some of the Palaeozoic fish papers are of obvious relevance to microvertebrate studies. In a volume of this nature, the end result is inevitably going to be something of a curate's egg. Several of the papers are of very good quality and high scientific importance, but many would have difficulty in finding an international journal to publish them. In some senses this doesn't matter – the volume is intended to be a readable compendium – but it certainly doesn't add to the sales potential or the desire to buy a copy. In addition, the editing is of a distractingly poor standard. The papers were originally published as a part of *Modern Geology* and were replete with errors at that stage. As far as I could discern, no effort has been made to either update the papers scientifically or to correct the earlier errors. Nevertheless, this is a book worth hunting down for at least some of the contributions – and the opening biography is recommended reading for all.

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Basic Palaeontology

M. J. Benton and D. A. T. Harper, Addison Wesley Longman 1997, ISBN 0 582 22857, 342pp, (Pbk) £22.99

On picking up' Basic Palaeontology', the excellent layout, presentation and production quality are immediately obvious. It is intended for 1st and 2nd year undergraduates studying courses in palaeontology and palaeobiology, and aims to provide a flavour of all aspects of palaeontology. As expected from such an overview, coverage is excellent, up to date and spans many principles and applications as well as all major fossil groups including invertebrates, vertebrates, microfossils, fossil plants and trace fossils.

The book is well written, well organised and easy to follow with chapters clearly ordered and laid out. It is comprised of 13 chapters of between 8 to 36 pages in length. Useful additions at the beginning of each chapter are bullet pointed key statements summarising the important points from within the chapter. These coupled with the introduction of at least two text boxes per chapter allows the inclusion of additional information. Selective further reading and reference sections close each chapter and clarification of palaeontological, biological and geological terms is provided within an extensive glossary at the back of the book. Despite the often small nature of the illustrations and photographs, they occur extensively throughout, are generally of a good quality and relate well to the text.

The beginning chapters review the development and growth of palaeontology as a science, outlining basic palaeontological and geological concepts. Stratigraphic principles, palaeoecology, palaeobiogeography and evolution are discussed. An encouraging feature within the early chapters, and one which sets the tone for the rest of the book, is the introduction of palaeobiostatistical techniques.

The following chapters deal with all major fossil groups, these are introduced as far as possible according to age of origin. The basic structure for describing group features includes morphology, classification, ecology, life modes, stratigraphic distribution, biogeography and provincialism. Within these chapters there is little repetition of material and certain sections link well with each other, e.g. plant palynomorphs and fossil plants. Chapters are careful to deal with the taxonomic classification of each group (often in a text box) so as not to create unnecessary problems with classification on an informal morphological basis. In addition, the clarity in which the classification for each particular group is presented is particulary good.

The book closes with a chapter entitled 'major

events' and discusses radiations and extinctions, with an interesting section outlining ten major adaptions / radiations in the history of life.

On a personal note some very minor irritations with the book include the flimsy thin card nature of the book cover which makes it liable to 'curling'. Many of the diagrams which have been taken from other publications are sourced at the front of the book, rather than within chapters and an inconsistent feature is the use of both stated magnification (i.e. x 150) and scale bars on illustrations.

In summary, the book achieves its targets well and sufficient detail is provided for 1st and 2nd year undergraduate courses in both palaeontology and palaeobiology. However, 3rd year students will almost certainly require additional reference sources for certain subjects. The coverage of all major fossil groups, use of diagrams, case histories and examples, coupled with the willingness to show a statistical and quantitative approach, is unique. Although the book is less detailed than Clarkson's '*Invertebrate Palaeontology and Evolution'*, it has more extensive coverage and will provide an excellent grounding and sound basis for all aspects of palaeontology at an undergraduate level.

A major asset of the book is that not only will students enjoy its clear layout and extensive coverage, but they will also be able to afford it. Priced at a very reasonable £22.99 it is value for money and well worth a look. To this end, I have no doubts that ' *Basic Palaeontology*' will become a core undergraduate text and deservedly so.

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Atlas of common benthic foraminiferal, species for Quaternary shelf environments of Western Canada

R.T. Patterson, S.M. Burbridge, and J.L. Luternauer, 1998. *Geological Survey of Canada Bulletin* 503, 1-91. ISBN 0-660-17435-9. Canadian $17.45.

The aim of the authors was to '...ease potential systematic difficulties for future researchers working with Quaternary foraminifera by inventorying dominant species of benthic foraminifera found on the British Columbian shelf.' The Atlas gives information on 103 'abundant and ecologically diagnostic' species. These were taken from nine cores Quaternary to sub-Recent) and one surface sediment sample from present water depths of 95-474m. Samples were processed on a 63 μm sieve.

Each species is placed in the Loeblich and Tappan (1987) classification with details of the type reference and generic name changes, together with a description of the test. In a few cases there are some additional remarks. Species are illustrated in 31 plates of SEM micrographs (with few exceptions, the illustrated examples are hypotypes) and the provenance of the material is given in the plate captions. No comparisons are made with type material for any of the taxa. There is an index of genera and species to plate number.

No information is given of the sediment types in which the species are encountered or any ecological/ distributional data (except for *Stainforthia feylingi*), nor is their stratigraphic occurrence in the nine cores presented or discussed. These are suprising omissions.

This is a nicely produced compilation which fulfills the authors' aims and will clearly be a valuable source reference for those studying sub-Recent and Quaternary deposits from the west Canadian shelf.

Reference:

Loeblich, A.R., and Tappan, H., 1987. *Foraminiferal genera and their classification*. Van Nostrand Reinhold Company, New York.

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The biology of hagfishes

Jørgensen, J.M., Lomholt, J.E., Weber, R.E. And Malte, H. (eds). Chapman and Hall, London, 578 pp. ISBN 0-412-78530-7 (hbk) £99.00.

If there's one thing that often bothers me about '*The biology of* ...' books, it's the absence of an introductory chapter on gross anatomy with nice, big annotated drawings. Some of the people who pick up this book will have very little idea of what a hagfish is. Even a specialist, having an off day and unable to recall, say, precisely where (and what) an islet organ is, would appreciate not having to flip through two chapters to be reminded.

With this rather personal rant out of the way (read: I couldn't remember what a bloody islet organ is), I have to say that *The biology of hagfishes* is a very good book. It's got 36 different chapters, covering the differ-

ent anatomical systems, taxonomy, ecology, development, and pathology. Near all of these chapters are succinctly and well written at a level appropriate for non-specialists. Even I could just about follow the chapter on 'Chromosome elimination and chromatin diminution in hagfishes' (Sei-ichi Kohno, Souichirou Kubota, and Yasuharu Nakai). The chapters are primarily reviews, but frequently present new research. The book also includes a few 'human interest stories', like the introductory chapter on early hagfish research (Ragnar Fänge) and the amazing picture of 'Hagfish prepared for broiling (seen only at Teradomari fish market)'. While the contents elicit few complaints, the quality of the halftone figures could be better, and the figure labels are blurred to a point usually only achieved after 2.5 whiskeys.

So, you're asking to yourself, "Okay, it's well-written, comprehensive book, but do I, as your average foram worker, really need a book about hagfishes?" Well, for most micropalaeontologists, *The biology of the hagfishes* doesn't rank as one of those books so useful you ought to have the contents tattooed on your arm. All conodont and other early vertebrate workers, however, should read the excellent chapters on THE fossil hagfish (David Bardack) and on 'Conodonts: a sister group to hagfishes?' (Richard J. Aldridge and Philip C. J. Donoghue). The rest of you, though perhaps not needing a copy for your office, should absolutely insist that your institution's library gets one.

On the basis that hagfish provide an indication for carcinogenic pollution, all environmental scientists ought to have access to the chapter on 'Tumor pathology of *Myxine glutinosa*' (Sture Falkmer). Histologists need to see the chapter on hagfish cartilage (Glenda M. Wright, Fred W. Keeley, and M. Edwin DeMont). Those interested the effects of fishing on marine ecosystems will appreciate the chapters on 'Asian hagfishes and their fisheries biology' (Yoshiharu Honma) and 'The ecology of hagfishes' (Frederic H. Martini). And the slimy skin of a sliming hagfish (Robert H. Spitzer and Elizabeth A. Koch) is simply fun for the whole family. I could go on, but, clearly, the point is that *The biology of hagfishes* contains something useful to workers from nearly every different field of biological science and I think many people will find it a valuable reference.

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Paleozoic sequence stratigraphy: Views from the North American Craton

B. J. Wizke, G. A. Ludvigson & J. Day (eds). *Geological Society of America Special Paper* **306.** 1996, 446 pp. ISBN 0-8137-2306-X. $115. $92 to GSA members

What you see is what you get. As the title indicates, this volume comprises a compilation of thirty papers addressing Cambrian through Permian sequence stratigraphy of the North American craton (actually, the US craton for the most part). To anyone with research interests within these groups of rocks – sedimentological, palaeontological or petroleum-related – this volume will be an essential purchase. Those with Ordovician and/or Carboniferous interests will be particularly well-served since, together (and predictably), these papers make up over half of the volume. The scope of each contribution varies from highly specific case studies such as the sequence stratigraphy of the Prairie du Chien Group (Smith *et al.*) and of the Glenwood Shale (Schutter) through to large-scale overviews of the the craton during the Ordovician (Holland & Patzkowsky), the Silurian (Ross & Ross; Johnson) and the Devonian (Day *et al.*).

Is there anything for those with no specific interest in the Palaeozoic sequence stratigraphy? Yes, on two counts. Firstly, a couple of papers address the theme of faunal distribution in relation to sequence stratigraphy. Chaplin examines the distribution of ichnofaunas through the Early Permian Chase Group of Oklahoma, noting that distinctive ichnofaunal assemblages characterise the lowstand, transgressive and highstand systems tracts. On a broader scale, Patzkowsky & Holland examine faunal tracking versus local extinction. The latter is termed 'regional extirpation' as part of the endless quest for needless sequence stratigraphic jargon – and is a misnomer of equal rank if they are trying to differentiate between partial and complete mortality. Anyway, they conclude that the 'extirpations' correlate with the introduction of siliclastic muds during flooding events and give rise to the introduction of new species. An added bonus for conodont workers is Kluessendorf & Mikulic explanation of the hitherto mysterious depositional setting of the Brandon Bridge Formation, the source of the only described Silurian conodont with preserved soft tissues.

The second theme of general interest to non-Palaeozoic workers is the provision of a significant body of case studies within cratonic interior settings. Cratonic interiors differ in several key ways from the margins on which sequence stratigraphy concepts (post-Sloss) were developed. This is particularly true when the sedimenta-

tion is dominated by carbonates, giving rise to successions with no lowstand systems tracts and with a prevalence of non-depositional lacunae in which the majority of time is represented.

Are there any short-comings? Not many. From a palaeontological perspective, an opportunity has been missed to revisit the biomere concepts of Palmer, albeit touched upon by Patzkowsky & Holland, in order to provide a more rigid sequence-based framework for such extinction and speciation events. This would be actually be a fruitful theme for a one day meeting but, otherwise, this is a useful contribution with some papers destined to be highly cited.

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Key Localities of the Northwest European Cretaceous

J. Mutterlose, A. Bornemann, S. A. Rauer, C. Spaeth, & C. J. Wood (eds.) Bochumer Geologische und geotechnische Arbeiten, 48 (1998), 231pp., 169 figs. Soft covers, A4 format. Price 35DM

This is a substantial and beautifully produced field guide to Cretaceous localities in and near Northern Germany. Its origins lie in the Fourth International Cretaceous Symposium held in Hannover in 1991. Five field trips were held after this conference and this book essentially consists of the field guides produced for these trips. The long publication delay was apparently due to "unforeseeable difficulties". During this delay the principal editors have been carrying out a vigorous research program in the Hannover - Braunschweig area and have completely revised their field guide, which has swollen to fill nearly half the volume. The other four guides are more or less as presented at the conference. So the end result is a book which combines a major synthesis of the field geology of the Cretaceous of the Hannover - Braunschweig area with four authoritative, if slightly dated, field guides to neighbouring areas. In more detail what you get are;

A. The Upper Cretaceous of Stevns Klint, Fakse and Mon (Denmark), by Bromley & Hansen. (20p.). i.e. a guide to the classic Maastrichtian and Danian localities of Eastern Denmark.
B. The White Chalk (Coniacian-Maastrichtian) of Lagerdorf and Kronsmoor (N. Germany), by Schultz & Weitschat. (18p.)
C. The Lower and Upper Cretaceous of the Hannover-Braunschweig area (NW Germany), by Mutterlose, Wood, Ernst, Rehfeld, & Troeger. (104p.). As explained above this is a major, up to date, review with much new information. A slight complication is that of the 15 localities mentioned here 8 were covered at length in Mutterlose et al. (1997 - Bochumer Geol. geotech. Arb., 46) and so are not given in detail here.
D. The Middle and Upper Cretaceous of the Muensterland (NW Germany), by Hiss, Kaplan, and others (56p.). This chapter has not been significantly revised but still includes much otherwise unpublished information.
E. The Campanian - Maastrichtian (Upper Cretaceous) of the Maastrichtian Type Area (Se Netherlands and NE Belgium), by Felder & Jagt (32p.). This includes the ENCI Quarry and many other key localities, but not the strange cave exposures described by Henk Brinkhuis at last years BMS AGM.

Each of the guides follows a similar basic format, with an introductory section on the geology of the area, followed by chapters on the specific localities. The locality details are semi-standardised on a template of Locality and Grid Reference; Remarks; Stratigraphy; Tectonic setting; Fauna; Bio- Event- and Sequence Stratigraphy; Palaeoenvironments. However, geology is not easily forced into standard categories and diversity soon sets in. Nonetheless, each guide provides an expert synthesis of the stratigraphy, palaeontology and sedimentology of the area covered. The palaeontological coverage is noticeably good including numerous illustrations of macrofossils, range charts for microfossils, and some nice nannofossil plates from Joerg Mutterlose.

Since the guides originated as excursion notes they are rather thin on locality details - cursory maps and no car parking or access details. Nonetheless, this book would be an invaluable source for anyone wishing to lead a field trip or undertake field research in any of the areas covered. The price of 35DM is so reasonable that the book is well worth buying for anyone with an interest in any of the areas. For ordering information contact Joerg Mutterlose:
`Joerg.Mutterlose@ruhr-uni-bochum.de`

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BRITISH MICROPALAEONTOLOGICAL SOCIETY

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SALE OF BACKPARTS OF VOLUMES 1 TO 12

The BMS holds stocks of backparts of Volumes 1 to 12 of the *Journal of Micropalaeontology*. The Journal was instigated in 1982 and has rapidly developed into one of the leading journals in the field; the subject matter and geographical scope varies widely and all microfossil groups are well represented. Society members, non-members and institutions may purchase backparts of Volumes 1 to 12 inclusive for £2.20 each including second class postage. Domestic postal charges are significantly less, the more copies are ordered, for example, full sets in the UK are £28 (£20 + £8 for parcel post and packing). Overseas clients should remit £3.50 per part inclusive of surface mail postage. Pre-payments are acceptable, but clients (especially from continental Europe and overseas) are advised to request an invoice to avoid over- and under-payments. The parts are £1 each exclusive of postage, therefore clients able to but them direct from the Secretary (address below) can make substantial savings. Individual copies (offprints) of papers are available at £0.70 each inclusive of (domestic) postage and packing. Authors of papers wishing to purchase multiple copies should direct enquiries to the Secretary; bulk discounts are available on papers from certain parts. Please indicate the parts you require in the left hand column below; a tick will indicate one copy. Should you wish to order multiple copies, please clearly indicate the number you require.

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Profile of the Society

The British Micropalaeontological Society (BMS) is a registered charity (No. 284013) founded in 1970, originally as the British Micropalaeontological Group (BMG), through the initiative of Professor Leslie Moore of Sheffield University. The original aims of the BMG were to promote micropalaeontology in the UK, to encourage the multidisciplinary study of British type sections, and to provide a means of communication.

The constituted objectives of the BMS is "the advancement of the education of the public in the study of Micropalaeontology". Although primarily aimed at the inhabitants of the U.K., membership is "open to all persons and organisations engaged or actively interested in the science of Micropalaeontology in the British Isles or in the British geological sequence".

The society currently has 689 members, of which 515 comprise individual members. According to the 1994 Directory of membership, 52% of the individual members were resident in the U.K., 20% in the rest of Europe, 14% in the U.S.A., and 14% in the rest of the world. In addition, the Society has 174 Institutional subscribers from around the world (32% U.S.A., 31% Europe, 19% U.K. and 18% rest of the world).

The BMS is organized and operated "exclusively for scientific and educational purposes and not for profit". Most activities of the society are organized by specialists groups (there currently five groups: Conodont, Foraminifera, Nannofossil, Ostracod and Palynology) and members may be associated with more than one group if they choose. Group meetings are held regularly throughout the year and the Annual General Meeting takes place in November (usually in University College London). Special meetings are held irregularly and have a multidisciplinary and/or international flavour.

The Main Committee of the Society is drawn from the membership. The posts of Chair, Secretary and Treasurer carry a three year term of office. Secretaries and treasurers may seek re-election for a second term of three years. Other members of the committee (including group representatives) are elected for a two year term of office and are eligible for a second term. The committee also includes the editors of both the Journal and Newsletter, as well as the Publicity Officer (position vacant) and Membership Treasurer.

The first committee meeting was held in 1971 (Leslie Moore as Chairman and Bernard Owens as Secretary/Treasurer), and the inaugural meeting took place in association with the Geological Society in Sheffield ('Microfossils and British Stratigraphy') during March of that year.

The BMG became a Society in 1975 under the chairmanship of Dr. Bob Cummings. A circular was produced until 1976, when the newsletter was inaugurated, as *The British Micropalaeontologist*, first edited by P.J. Bigg. The newsletter was renamed *Newsletter of Micropalaeontology* in 1995. The first BMS publication (apart from *A Stereo-Atlas of Ostracod Shells*) was *A Stratigraphical Index of British Ostracoda* (edited by Ray Bate and Eric Robinson) which appeared in 1978 and was published as a Special Issue of *Geological Journal*. Subsequent volumes have been published as a series, commencing with the *Stratigraphical Atlas of Fossil Foraminifera* (edited by Graham Jenkins and John Murray) in 1980. Since then, ten further special publications have published for the BMS by Ellis Horwood Ltd., and since 1990, two by Chapman and Hall. During this time, stratigraphical indices or atlases have been produced for ostracods, foraminifera (2 editions), nannofossils, conodonts and dinoflagellate cysts, as well as a number of thematic volumes. These are available to BMS members at discounted rates.

Since 1977, the Society has published, biannually, its own micropalaeontographical series: *A Stereo-Atlas of Ostracod Shells* (first produced in 1973, edited by Professor Peter Sylvester-Bradley and Dr. David Siveter of Leicester University), and occasional field guides. The year 1982 is a milestone in BMS history as this saw the initiation of the society's own journal, the *Journal of Micropalaeontology* (first edited by Lesley Sheppard). The Journal was initially produced once a year, but since 1984 has become established as a twice yearly publication of growing international repute. The editor and the editorial board will consider for publication original papers and review articles dealing with all aspects of micropalaeontology.

Taxonomic/nomenclature disclaimer

Newsletter of Micropalaeontology is not deemed to be valid for taxonomical or nomenclatural purposes - see International Codes of Botanical and Zoological Nomenclature.

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